Standard Label†	Definition	Codification Reference
(Loss) Included in Other Comprehensive Income	component of shareholders' equity).	
Fair Value, Measurement with Unobservable Inputs Reconciliation, Recurring Basis, Liabilities, Purchases	This element represents purchases that have taken place during the period in relation to liabilities measured at fair value on a recurring basis using unobservable inputs (Level 3).	820-10-50-2(c)(2)
Fair Value, Measurement with Unobservable Inputs Reconciliation, Recurring Basis, Liabilities, Sales	This element represents sales that have taken place during the period in relation to liabilities measured at fair value on a recurring basis using unobservable inputs (Level 3).	820-10-50-2(c)(2)
Fair Value, Measurement with Unobservable Inputs Reconciliation, Recurring Basis, Liabilities, Issuances	This element represents issuances that have taken place during the period in relation to liabilities measured at fair value on a recurring basis using unobservable inputs (Level 3).	820-10-50-2(c)(2)
Fair Value, Measurement with Unobservable Inputs Reconciliation, Recurring Basis, Liabilities, Settlements	This element represents settlements that have taken place during the period in relation to liabilities measured at fair value on a recurring basis using unobservable inputs (Level 3).	820-10-50-2(c)(2)
***Fair Value, Assets Measured on Recurring Basis [Table]**	Summarization of information required and determined to be disclosed concerning assets, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on a recurring basis.	820-10-50-2(a) through (b)

Standard Label†	Definition	Codification Reference
*Fair Value, Assets Measured on Recurring Basis, Disclosure Items [Axis]	This element represents a number of concepts that are required or desirable disclosure items concerning assets, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
*Fair Value, Assets Measured on Recurring Basis, Disclosure Items [Domain]	Provides the general information items required or determined to be disclosed with respect to assets, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
*Estimate of Fair Value, Fair Value Disclosure [Member]	This element represents the fair value of financial instruments (as defined), including financial assets and financial liabilities (collectively, as defined) for which it is practicable to estimate such value.	820-10-50-2(a) through (b)
*Fair Value, Inputs, Level 1 [Member]	This item represents the amount of assets or liabilities, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on either a recurring or nonrecurring basis and fall within Level 1 of the fair value measurement hierarchy. Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date.	820-10-50-2(a) through (b)
*Fair Value, Inputs, Level 2 [Member]	This item represents the amount of assets or liabilities, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on either a recurring or nonrecurring basis and fall within Level 2 of the fair value measurement hierarchy. Level 2 inputs are inputs other than quoted	820-10-50-2(a) through (b)

Standard Label†	Definition	Codification Reference
	prices included within Level 1 that are observable for the asset or liability, either directly or indirectly. Level 2 inputs include the following: (1) quoted prices for similar assets or liabilities in active markets, (2) quoted prices for identical or similar assets or liabilities in markets that are not active; that is, markets in which there are few transactions for the asset or liability, the prices are not current, or price quotations vary substantially either over time or among market makers (for example, some brokered markets), or in which little information is released publicly (for example, a principal-to-principal market), (3) inputs other than quoted prices that are observable for the asset or liability (for example, interest rates and yield curves observable at commonly quoted intervals, volatilities, prepayment speeds, loss severities, credit risks, and default rates), or (4) inputs that are derived principally from or corroborated by observable market data by correlation or other means (market-corroborated inputs).	
***Fair Value, Inputs, Level 3 [Member]**	This item represents the amount of assets or liabilities, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on either a recurring or nonrecurring basis and fall within Level 3 of the fair value measurement hierarchy. Level 3 inputs are unobservable inputs for the asset or liability. Unobservable inputs are used to measure fair value to the extent that observable inputs are not available; for example, when there is little, if any, market activity for the asset or liability at the measurement	820-10-50-2(a) through (b)

Standard Label†	Definition	Codification Reference
	date.	
RECURRING/ASSET		
***Fair Value, Assets Measured on Recurring Basis, Financial Statement Captions [Line Items]**	This element represents certain statement of financial position asset captions, which represent a class of assets, or that may include an individual asset, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Assets Measured on Recurring Basis, Trading Securities	This element represents a certain statement of financial position asset caption, which represents a class of assets, or one that may include an individual asset, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Assets Measured on Recurring Basis, Trading Securities, Equity Securities	This element represents a certain statement of financial position asset caption, which represents a class of assets, or one that may include an individual asset, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Assets Measured on Recurring Basis, Trading Securities, Debt Securities	This element represents a certain statement of financial position asset caption, which represents a class of assets, or one that may include an individual asset, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Assets Measured on Recurring Basis, Available-for-Sale Securities, Residential Mortgage-Backed Securities	This element represents a certain statement of financial position asset caption, which represents a class of assets, or one that may include an individual asset, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Assets Measured on Recurring Basis, Available-for-Sale Securities, Commercial Mortgage-Backed	This element represents a certain statement of financial position asset caption, which represents a class of assets, or one that may include an individual asset, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)

Standard Label†	Definition	Codification Reference
Securities		
Fair Value, Assets Measured on Recurring Basis, Available-for-Sale Securities, Collateralized Debt Obligations	This element represents a certain statement of financial position asset caption, which represents a class of assets, or one that may include an individual asset, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Assets Measured on Recurring Basis, Available-for-Sale Securities, U.S. Treasury Securities	This element represents a certain statement of financial position asset caption, which represents a class of assets, or one that may include an individual asset, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Assets Measured on Recurring Basis, Derivatives-Interest Rate Contracts	This element represents a certain statement of financial position asset caption, which represents a class of assets, or one that may include an individual liability, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Assets Measured on Recurring Basis, Derivatives-Foreign Exchange Contracts	This element represents a certain statement of financial position asset caption, which represents a class of assets, or that may include an individual liability, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
RECURRING/LIABILITY		
***Fair Value, Liabilities Measured on Recurring Basis [Table]**	Summarization of information concerning assets required and determined to be disclosed, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
***Fair Value, Liabilities Measured on Recurring Basis, Disclosure Items [Axis]**	This element represents a number of concepts that are required or desirable disclosure items concerning assets, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on a recurring	820-10-50-2(a) through (b)

Standard Label†	Definition	Codification Reference
	basis.	
***Fair Value, Liabilities Measured on Recurring Basis, Disclosure Items [Domain]**	This element represents a number of concepts that are required or desirable disclosure items concerning liabilities, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
***Estimate of Fair Value, Fair Value Disclosure [Member]**	This element represents the fair value of financial instruments (as defined), including financial assets and financial liabilities (collectively, as defined) for which it is practicable to estimate such value.	820-10-50-2(a) through b)
***Fair Value, Inputs, Level 1 [Member]**	This item represents the amount of assets or liabilities, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on either a recurring or nonrecurring basis and fall within Level 1 of the fair value measurement hierarchy. Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date.	820-10-50-2(a) through (b)
***Fair Value, Inputs, Level 2 [Member]**	This item represents the amount of assets or liabilities, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on either a recurring or nonrecurring basis and fall within Level 2 of the fair value measurement hierarchy. Level 2 inputs are inputs other than quoted prices included within Level 1 that are observable for the asset or liability either directly or indirectly. Level 2 inputs include the following: (1) quoted prices for similar assets or liabilities in active markets, (2) quoted	820-10-50-2(a) through (b)

Standard Label†	Definition	Codification Reference
	prices for identical or similar assets or liabilities in markets that are not active, that is, markets in which there are few transactions for the asset or liability, the prices are not current, or price quotations vary substantially either over time or among market makers (for example, some brokered markets), or in which little information is released publicly (for example, a principal-to-principal market), (3) inputs other than quoted prices that are observable for the asset or liability (for example, interest rates and yield curves observable at commonly quoted intervals, volatilities, prepayment speeds, loss severities, credit risks, and default rates), or (4) inputs that are derived principally from or corroborated by observable market data by correlation or other means (market-corroborated inputs).	
***Fair Value, Inputs, Level 3 [Member]**	This item represents the amount of assets or liabilities, including (financial) instruments that are classified in stockholders' equity, which are measured at fair value on either a recurring or nonrecurring basis and fall within Level 3 of the fair value measurement hierarchy. Level 3 inputs are unobservable inputs for the asset or liability. Unobservable inputs are used to measure fair value to the extent that observable inputs are not available; for example, when there is little, if any, market activity for the asset or liability at the measurement date.	820-10-50-2(a) through (b)

Standard Label†	Definition	Codification Reference
***Fair Value, Liabilities Measured on Recurring Basis, Financial Statement Captions [Line Items]**	This element represents certain statement of financial position liability captions, which represent a class of liabilities, or that may include an individual liability, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Liabilities Measured on Recurring Basis, Long-term Debt	This element represents a certain statement of financial position asset caption, which represents a class of liabilities, or that may include an individual liability, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Liabilities Measured on Recurring Basis, Derivatives-Interest Rate Contracts	This element represents a certain statement of financial position asset caption, which represents a class of liabilities, or that may include an individual liability, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)
Fair Value, Liabilities Measured on Recurring Basis, Derivatives-Foreign Exchange Contracts	This element represents a certain statement of financial position asset caption, which represents a class of liabilities, or that may include an individual liability, measured at fair value on a recurring basis.	820-10-50-2(a) through (b)

Exhibit C

Methodology

RMBS Insight: U.S. Residential Mortgage-Backed Securities Loss Model and Rating Methodology

JANUARY 2012

DBRS

Insight beyond the rating.

CONTACT INFORMATION

U.S. STRUCTURED FINANCE

Quincy Tang
Senior Vice President
U.S. Structured Finance - RMBS
Tel. +1 212 806 3256
qtang@dbrs.com

Sagar Kongettira
Vice President
U.S. Structured Finance - RMBS
Tel. +1 212 806 3266
skongettira@dbrs.com

Claire J. Mezzanotte
Managing Director
U.S. Structured Finance - ABS/RMBS
Tel. +1 212 806 3272
cmezzanotte@dbrs.com

U.S. STRUCTURED FINANCE - RESEARCH, MODELING

William Alexander
Senior Vice President
U.S. Structured Finance - ABS/RMBS
Tel. +1 212 806 3212
walexander@dbrs.com

U.S. STRUCTURED FINANCE - OPERATIONAL RISK

Kathleen Tillwitz
Senior Vice President
U.S. Structured Finance - ABS/RMBS
Tel. +1 212 806 3265
ktillwitz@dbrs.com

Related Research:
Legal Criteria for U.S. Structured Finance Transactions
Representations and Warranties Criteria for U.S. RMBS Transactions
Third-Party Due Diligence Criteria for U.S. RMBS Transactions
Operational Risk Assessment for U.S. RMBS Servicers
Unified Interest Rate Model for U.S. RMBS Transactions

DBRS is a full-service credit rating agency established in 1976. Privately owned and operated without affiliation to any financial institution, DBRS is respected for its independent, third-party evaluations of corporate and government issues, spanning North America, Europe and Asia. DBRS's extensive coverage of securitizations and structured finance transactions solidifies our standing as a leading provider of comprehensive, in-depth credit analysis.

All DBRS ratings and research are available in hard-copy format and electronically on Bloomberg and at DBRS.com, our lead delivery tool for organized, Web-based, up-to-the-minute information. We remain committed to continuously refining our expertise in the analysis of credit quality and are dedicated to maintaining objective and credible opinions within the global financial marketplace.

This methodology replaces and supersedes all related prior methodologies. This methodology may be replaced or amended from time to time and, therefore, DBRS recommends that readers consult www.dbrs.com for the latest version of its methodologies.

RMBS Insight: U.S. Residential Mortgage-Backed Securities Loss Model and Rating Methodology

TABLE OF CONTENTS

Introduction

RMBS INSIGHT: THE RESIDENTIAL LOSS MODEL

DBRS introduces RMBS Insight, its new residential loss model that estimates loan-level default probability, loss severity and expected loss for a pool of mortgage loans. RMBS Insight evaluates mortgage pools on a loan-level basis and provides various risk reports of the entire pool or segments thereof. The sum of the loss estimates from each mortgage provides the estimate of losses for a pool of loans.

As detailed in Appendix 1 and Appendix 2 of this report, the RMBS Insight model also incorporates results from qualitative reviews on operational risk, third-party due diligence and representations and warranties, which are integral parts of the DBRS rating methodology. Any transaction-specific assumptions that deviate from this methodology will be detailed in the related rating reports and/or press releases.

UNIQUE ASPECTS OF RMBS INSIGHT

Comprehensive Coverage

RMBS Insight consists of multiple sub-modules, or models, which cover the rating analytics of a variety of asset types that include newly-originated and seasoned pools, liquidating trust (of non-performing loans or NPLs), Federal Housing Administration (FHA) and Veterans Affairs (VA) securitizations, (interest rate) swap termination payments, as well as re-securitizations of real estate mortgage investment conduits (ReREMICs).

Since there are commonalities in analyzing all of these asset types, this methodology generally does not have a separate section for each product except for where the analytics differ. For example, the default and loss severity analysis of NPLs, swap termination payments and ReREMICs all conform to that of seasoned loans, with the exception of the cash flow treatment for NPLs and swap termination payments. Similarly, as a loan migrates from new to seasoned, the same origination attributes still matter and will be analyzed in conjunction with the seasoned characteristics. However, their impact on the default probability diminishes (on a sliding scale) as the loan ages or becomes more delinquent. By the time a seasoned loan becomes 90+ days delinquent, the origination attributes are of secondary importance.

Consideration of Regional Economic Data

The experience of the last decade has made it apparent that it is not credible to consider loan performance without factoring in house prices and unemployment rates. In our dataset, DBRS has analyzed a number of regional economic factors and their effect on actual loan performance on a Metropolitan Statistical Area (MSA) level. The following factors are incorporated into RMBS Insight at an MSA level:

1. Growth rate in civilian labor force.
2. Per-capita income.
3. Unemployment rate.
4. House price index.

User-Input Assumptions and Variables

Macroeconomic conditions, prepayment speeds and liquidation timelines change with time, servicers and asset pools. DBRS has analyzed these variables and incorporated their impact to loan performance into RMBS Insight.

RMBS Insight provides users with the option to forecast quantities of the variables listed below. In this way, the model is ideally set up for scenario analysis. These assumptions are based on actual observations and industry forecasts, or when DBRS deems that additional stresses are warranted.

1. Future changes in unemployment rates.
2. Future changes in house prices (in addition to the DBRS baseline forecast).

3. Voluntary prepayment rate (CPR).
4. Future changes in liquidation timelines.
5. Future changes in months in real estate-owned (REO) properties.
6. Roll rates from 180 Days delinquency to default.

Rating Category Stress Algorithm – An Asset Correlation and Simulation Approach

Rating category stress levels are predicated on models of joint loan behavior, both default and recovery. The parameters of these models are estimated from historical performance data. Working up from the loan-level produces results that are sensitive to the nature of the pool (or portfolio) being analyzed. The distributions of expected default, loan balance, and property location will all impact the rating stress levels. The stress levels themselves are determined so that the probability of exceeding the level is less than a target value, or confidence interval, as established by the DBRS published idealized default table in Appendix 6.

Because of the complexity of the relationships, a simulation approach is taken to determining the portfolio-level distributions of default and recovery. The simulation approach enables the resulting stress levels to fully realize the dependencies that have been modeled.

KEY ENHANCEMENTS FROM PRE-CRISIS

Effect of FICO

Although FICO score is still a key risk factor, the effect of FICO has lessened for recent originations and therefore the reliance on FICO in the model is reduced.

Incorporation of Home Prices

Following the most recent credit crisis, it is clear that it is impossible to ignore the effect of home prices on pool performance. RMBS Insight incorporates home prices in the following manners:

1. The default model incorporates updated values of the owner's equity in the property.
2. The severity model incorporates updated estimates of property value.
3. Ratings levels are derived, in part, by the application of additional market value declines (MVD) to the models.

Shrinkage Factor (or Deal Adjustment)

DBRS introduces the shrinkage factor in its RMBS Insight Model. In our model validation, DBRS noticed that "good" loans (loans with good collateral attributes) in a subprime pool tended to perform worse than if the same loans were included in a prime pool. The worse performance is suspected to at least be partially driven by the assignment process (of these loans into a subprime pool) which may be a reflection of looser underwriting standards. The opposite is also true. When a "bad" loan showed up in a prime pool, it tended to exhibit better performance than if it was included in a subprime pool. The loan may represent an "exception" to the underwriting process that underwent additional scrutiny.

Applying a shrinkage factor in transactions pulls each loan closer to the average. A "good" loan in a subprime deal may not deserve the credit it would otherwise have received. Conversely, a "bad" loan in a prime deal may not be as bad as its collateral attributes have suggested.

Concentration Risk in Loan Size and Geography

The risk presented by concentrations is that of an increased chance of loss exceeding the expected level rather than an increase in the expected level of loss. As such, the effect of concentration risk appears in the BB to AAA rating scenarios and not the B level estimates. Concentration is measured by a Herfindahl index calculated on both a geographic and loan-size basis. The level of asset correlation is determined by the levels of concentration and credit quality. The asset correlation is an important factor in the determination of rating levels.

Small Pools
For securitizations consisting of fewer than 300 loans, RMBS Insight incorporates a small pool adjustment. Small pools are typically more sensitive to certain large loans incurring losses and therefore may exhibit a risk in excess of the model estimate. Small pool adjustments vary by loan count and rating category.

Dynamic Cash Flow Assumptions
The complexity of the capital structures in RMBS transactions requires testing various combinations of cash flow stresses to properly analyze a bond. DBRS incorporates a dynamic cash flow analysis in our rating process. A baseline of multiple prepayment scenarios, loss timing curves and interest rate stresses are generally applied to test the resilience of a bond. An appropriate rating is one that can withstand the combination of DBRS-modeled cash flow stresses without the rated class incurring any interest shortfalls or principal writedowns. DBRS generally runs 40 scenarios in each rating category to test the sensitivity of the rated securities to various cash flow stresses.

These enhancements are discussed in detail in later sections.

GENERAL FINDINGS
In analyzing the data and developing RMBS Insight, there are a number of general findings that are of note. These observations are multivariate in nature. That is, they hold true even after adjusting for other risk factors.

- The three most important risk factors are:
    1. FICO score
    2. Current loan-to-value (LTV) and Current Combined LTV and
    3. Future equity in the home – forecasted based on a two-year horizon
    4. The effect of FICO scores has lessened for recent originations.
- Condos, second homes and investor properties have increased in risk for recent originations.
- Unemployment is an important risk factor.

MODEL VALIDATION
Upon the completion of RMBS Insight, DBRS also conducted a validation of the model results by comparing them against actual historical performance. The validation is done for both probability of default and loss severity, and the results are detailed in Appendix 4 of this methodology.

Modeling Methodology

DATA
RMBS Insight consists of multiple sub-modules, or models that are built using statistical methods. The details are important with such modeling. The purpose of this section is to enumerate the key details of the methodology.

The following data sources are used to build and validate the RMBS Insight models:

- MBS Data LLC database of securitized loans.
- Regional economic data from the St. Louis Federal Reserve FRED II database.
- Case-Shiller home price indices.

The dataset covers the period between 2000 and 2010. The bulk of originations occurred in the middle of this period. There is loan performance data subsequent to 2007, but few originations. The period covers a wide range of economic conditions. It is well suited to indentifying the effects of house prices and unemployment on default and loss rates.

The MBS Data LLC dataset contains approximately 23 million origination records and 760 million historical remittance records. It is neither practical nor necessary to use all these loans to build the models. Instead, a sample is taken when building each of the statistical models. The sampling method for each model is detailed in later sections, starting from "Sampling" in "Probability of Default".

OVERVIEW

As part of its rating methodology for U.S. RMBS, DBRS analyzes mortgage probability of default by examining the following components:

1. Borrower characteristics and credit risk.
2. Mortgage loan characteristics.
3. Mortgaged property characteristics.
4. Regional economic characteristics: both in the past and forward-looking.

If a loan is seasoned (aged six months or more), then additional characteristics are considered:

5. Current pay status (delinquency, bankruptcy, foreclosure).
6. Payment history.
7. Loan modifications.
8. Payment shock.
9. Loan Age.

The relative weights of these characteristics are determined simultaneously by fitting the model to loan-level data via statistical techniques. The exact effect of changes in these characteristics on the probability of default depends on the values of the other characteristics. In addition, the effect of changes in the characteristics is generally non-linear. For example, the effect on default probability of loan-to-value (LTV) moving from 80% to 85% is not the same as LTV moving from 90% to 95%.

For a seasoned loan, the origination attributes still matter and will be analyzed in conjunction with the seasoned characteristics listed above. However, their impact on the default probability diminishes as the loan ages or becomes more delinquent. By the time a seasoned loan becomes 90+ days delinquent, the origination attributes are of secondary importance.

Furthermore, seasoned loans, depending on the origination vintage, may represent lax underwriting processes, weak policies and controls and inflated appraisals. Some of these risks are manifested in deal performance over time, and are therefore captured through the seasoned characteristics by the model. Additional haircuts on appraisals and slower prepayment speeds may be warranted to address these risks on seasoned loans.

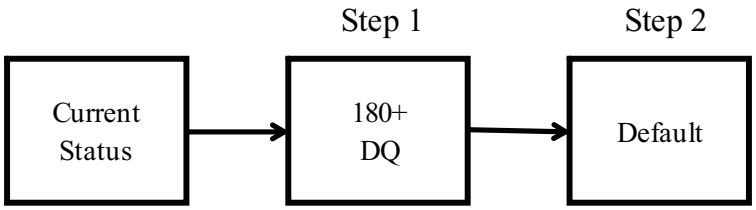
We will discuss, in detail, these characteristics and their interactions in later sections.

MODEL STRUCTURE

Conceptual Default Process

A conceptual map of the default process, as shown as Figure 1, is used to inform the model structure.

Figure 1. Conceptual Default Process



This is a simplified figure that views default as a two-step process. The first step in the process occurs when a loan moves from current to 180 days delinquent. The second step happens when a loan moves into default. Default in this context means "charged off" and removed from the trust. At default, the loss severity is known and final losses are determined. A seasoned loan drops into the process based on its current status. For example, a loan that is 210 days delinquent starts at the second step in Figure 1.

A value of 180 days delinquent is used for the first move in Figure 1. There are a number of alternatives such as:

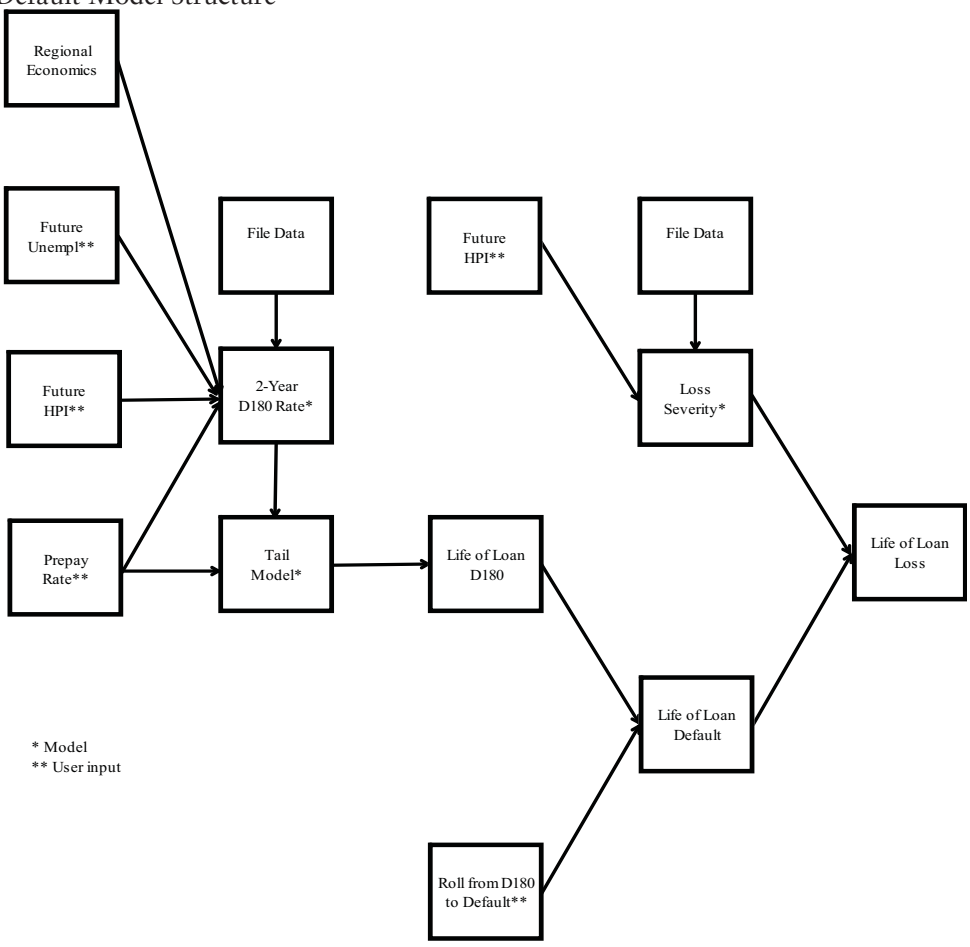
1. The loan enters foreclosure,
2. A lower delinquency value,
3. Actual default – so Figure 1 would become a one-step process.

The value of 180 days is a practical one. In terms of foreclosure, even in normal times, there is a range of practice among servicers that creates noise unrelated to borrower behavior. In recent history, a group of loans had developed serious delinquencies but are not in foreclosure. These would look as if they had not taken the first step, when they are actually at a high risk of default. Alternatively, to the extent that foreclosure starts at a lower delinquency rate, there can be a significant probability of cure that would need to be considered. Finally, using the actual default causes unneeded difficulties in modeling. The time frame to default can be long and is highly variable. The step to 180 days delinquent occurs in a rather stable fashion. Waiting for the movement from 180 days delinquent to default adds little but time.

Using Figure 1 as a mental model of the default process, a number of models and user-input assumptions are assembled to produce the model structure. The model structure is shown in Figure 2.

Default Model Structure

Figure 2. Default Model Structure



The structure here appears rather complex. The complexity of the modeling structure in Figure 2 is driven by two factors:

1. It shows the inputs required by the model and
2. There are a number of distinct models required to implement the process outlined in Figure 1.

In part, the complexity of the modeling structure is driven by the need to produce a life-of-loan forecast. It is not wise to target a life-of-loan 180-day delinquency value directly in modeling for two reasons:

1. It takes too long. One would have to wait for entire cohorts to work through their lifecycle.
2. The expected time a loan is on the books depends on other factors, such as the prepayment rate, which vary over time. The default rate in slow-prepay eras is higher, all else being equal, simply because loans are at risk for a longer period. It is important that this factor be explicitly built into the structure.

Instead, the life-of-loan 180-day delinquency rate is backed into. The basic concept is to produce a monthly, conditional 180-day delinquency rate. This is just like a conditional default rate (CDR) but where one defines 'default' to be 180-days delinquent. When combined with a prepayment assumption, the life-of-loan unconditional 180-day delinquency rate can be calculated. This value gives the probability a loan will become 180 days delinquent at some point during its life.

Derivation of Life-of-Loan Default Rate – The Delinquency Score Model and Tail Model

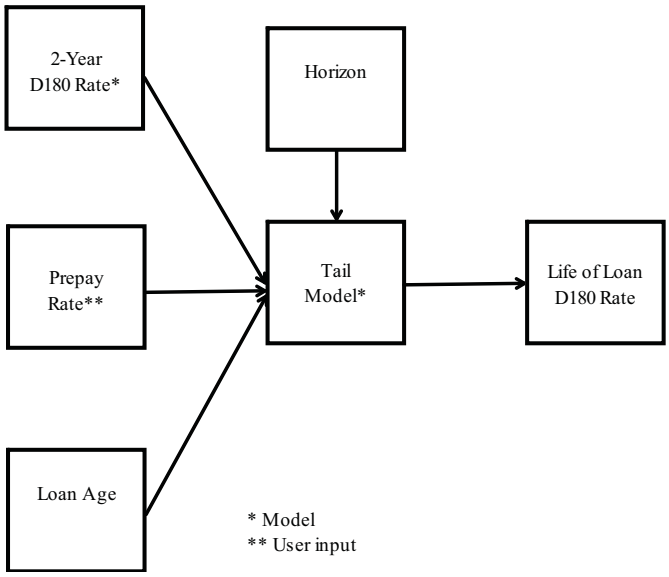
Two models combine to produce the monthly, conditional 180-day delinquency rate. The two models are:

1. The 2-Year D180 Rate Model (referred to as the Delinquency Score). This model estimates the probability a loan becomes 180 days delinquent in the first two years of the forecast.
2. The tail model. This model estimates, month by month, the 180-day delinquency rate for months 25 and on.

The heavy analytics are done by the 2-Year D180 Rate Model (Delinquency Score). Here is where the detailed modeling is done. The output of this model is an estimate of the probability the loan becomes 180 days delinquent sometime in the next two years. This model 'sets the course' for future performance. The tail model takes this level, along with loan age and the horizon (month into the forecast) and produces the monthly incidence rate for the remaining life of the loan.

Figure 3 displays graphically how these models work together to produce a life-of-loan 180-day delinquency rate.

Figure 3. Producing a life-of-loan 180-day delinquency rate



There are a number of model structures and techniques that could have been used to produce a monthly conditional 180-day delinquency rate. Conditional logistic models and proportional hazard models are two common ones. The 2-Year D180 rate (Delinquency Score) model uses a robust, well-tried technology. The model is easy to implement, track and validate. During the first two years, borrower defaults are most dependent upon the loan characteristics at the point of forecast. Afterwards, the impact of loan risk attributes diminishes, and defaults are more influenced by macroeconomic variables. On the contrary, periods shorter than two years offer less time for serious delinquency to occur. The technology behind the 2-Year D180 model is well-known to any modeler within the consumer finance industry.

From Life-of-loan 180-day Delinquency Rate to Ultimate Default

Once the life-of-loan, 180-day delinquency rate has been estimated, it is time to move to the second step of the process outlined in Figure 1: moving the loan from 180 days to ultimate default and liquidation. This step is straight-forward. A user-input roll rate is applied to the life-of-loan 180-day delinquency rate. Again, one of the values of using 180-day delinquency rate in the first step is that there is not much left for modeling at this stage. At this point, the life-of-loan default rate has been produced.

Loss Severity

A severity must be applied to the default rate to arrive at a loss rate. For second liens, DBRS applies a severity of 100% plus six months of interest, if advanced by the servicer, calculated at the note rate. For first liens, the severity is calculated as follows:

1. A recovery value is estimated from the statistical recovery model.
2. Interest advancing (if desired) is subtracted from the recovery.
3. Loss is calculated as the shortfall of recovery to loan balance outstanding.

The next sections consider the default and loss severity methodologies in detail.

Probability of Default

DELINQUENCY SCORE

Model Specification

The Delinquency Score, or the 2-Year D180 Rate Model, is similar in spirit to the kinds of scores one sees in consumer credit. The delinquency score is series of statistical models that are built on loan-level data. For each loan in the data set, there is an "as-of" date. This is the date of the forecast, everything after this date is the "future".

Each loan in the modeling dataset consists of the following data:

1. Explanatory variables that are known – both at model build and when running a forecast – at the as-of date. These are values such as current delinquency status, FICO and LTV.
2. Explanatory variables that are known at model build but will be unknown when running a forecast. Future house prices and unemployment rates are examples of such variables.

The outcome for the loan, coded as a 1 – the loan became 180 days delinquent in the 2 years after the as-of date or a 0 – the loan did not.

The statistical method (in this case, logistic regression), finds the mapping from the first two that best explains the third. In practice, one will not know the values in (2). Instead, forecasts or scenarios for these values are used.

Explanatory Variables

Table 1 gives the explanatory variables in the models, definitions and their types.

Table 1. Variable Types in the Delinquency Score

Explanatory Variable	Type	Description
Bankrupt	Categorical	Borrower is in bankruptcy
In Foreclosure	Categorical	Property is being foreclosed
Censor Age	Categorical	Month at which future 24 months is censored
Equity in 24 Months	NonLinear	Equity in the property 24 months after the as-of date
Product Variables	Categorical	Product type, IO indicator variables, etc.
FICO	Linear	FICO at origination
Unemployment Rate	Linear (Capped)	Unemployment rate at the as-of date
Change in Unemployment Rate	Nonlinear	Change in unemployment rate: 24 months from the as-of date
# Times 30 days DQ in last 36 Months	Nonlinear	Using MBA DQ definition
# Times 60 days DQ in last 36 Months	Nonlinear	Using MBA DQ definition
# Times 90+ days DQ in last 36 Months	Nonlinear	Using MBA DQ definition
DQ Score at Origination	Nonlinear	Output of delinquency score at origination (used for seasoned loans)
Loan Balance	Nonlinear	Current balance
Loan Age	Nonlinear	Loan age at as-of date (from first payment date)
Loan Modification	Categorical	Recapitalization or rate reduction
Payment Shock	Categorical	Teaser period end, or IO/Negam period ends, etc.
Property Type	Categorical	Single-family, multi-family, condo, townhouse, PUD, etc.
LTV/Combined LTV	NonLinear	LTV/CLTV at the as-of date
UPB to Income	Linear (Capped)	Ratio of balance to per capita income at MSA-level
Occupancy	Categorical	Primary, second or investor properties
Loan Purpose	Categorical	Purchase or refinance
State	Categorical	Property state
Growth in Civilian Labor Force	NonLinear	Trailing 1-year growth rate (MSA-level)
Documentation	Categorical	Full, limited, reduced, etc.
Vintage	Categorical	Year of first payment

There are two potential types of explanatory variables in the models: categorical and continuous. An example of a categorical variable is documentation type. It has different categories such as “full”, “stated”, and “reduced”. Continuous variables refer to characteristics such as FICO or LTV, where the values are continuous within a defined range.

Sampling

The MBS Data LLC dataset contains information on approximately 23 million loans. It is neither practical nor necessary to use all of these loans to build a model. Instead, a sample is taken. In order to make the most effective use of the dataset, the sampling is stratified. The idea is to even out the sample on certain variables so that the model-build sample is not dominated by specific values of these variables. For instance, in the database approximately 10% of the loans are 2-year hybrid adjustable rate mortgages (ARM) whereas 7-year hybrid ARMs are about 0.25% of loans. Evening out the sample improves the ability to understand 7-year hybrids without impeding understanding the 2-year hybrids. A similar method is applied to the property states so that the dataset is not dominated by large states such as California or Florida.

The sample is stratified on these characteristics:

1. Loan Age.
2. Property State.
3. Loan Product.
4. Vintage.

The sample sizes in the modeling datasets are:

1. 234,000 for fixed first-liens at origination.
2. 212,000 for ARM first-liens at origination.

3. 234,000 for second-liens at origination.
4. 859,000 loans that are seasoned and not delinquent.
5. 126,000 loans that are seasoned and 30-60 days delinquent.
6. 41,000 loans that are seasoned and 90-150 days delinquent.

Segmentation and Interactions

The delinquency score consists of six separate models. The segmentation used is:

- Forecast: Loan Origination
  1. First-lien fixed-rate loans.
  2. First-lien ARM loans.
  3. Second-lien closed-end loans.
- Forecast: Seasoned Loan
  4. The loan is not delinquent.
  5. The loan is 30-60 days delinquent.
  6. The loan is 90-150 days delinquent.

The primary segmentation is whether the forecast is for a newly originated loan or a seasoned loan. For newly originated loans, the secondary segmentation is along product types. The fact that second liens would react differently to the explanatory variables is to be expected. Similarly between fixed-rate loans and ARM loans, there is a natural self-selection into the products. A fixed-rate first lien does not offer the features that lower payments for those individuals who, for whatever reason, are looking to minimize initial payments or maximize loan amount. For seasoned loans, the secondary segmentation is along current delinquency status. The greater the delinquency, the fewer explanatory factors enter the model and the lower the weight applied to origination variables (e.g. FICO at origination, documentation type).

Another consideration in specifying the models is interactions. It is possible, for example, that the contribution to risk of a loan having "stated" documentation type depends on whether the borrower credit is subprime or not. In building these models, DBRS looked for interactions. If one finds that the effect of lots of the variables change with the levels of a categorical variable, it may make sense to build separate models for the different categories.

Beyond the segmentation, the Delinquency Score models do incorporate a number of interactions. Key interactions are:

- FICO by Vintage
  The slope of FICO has flattened over time. That is, the change in risk for a change in FICO has declined.
- Property type by Vintage
  Condos have increased in risk for more recent originations.
- Occupancy by Vintage
  Second homes and investor properties have increased in risk in recent originations.
- Origination Delinquency Score by Loan Age
  The origination delinquency score is an explanatory factor in the seasoned-loan delinquency score. The importance of the score fades as the loan ages.
- # of times 30 (60, and 90+) days delinquent in last 36 months by Age
  Not surprisingly, the contribution to risk of 3 times 30 days delinquent depends on whether the loan is 6 months old or 60 months old.

Effects of Explanatory Variables

Given the nature of the models, the most direct way to measure the effect of a variable is by examining the *odds ratio*. Take, for example, documentation type. The odds ratio comparing documentation type FULL to REDUCED is:

P[FULL]/(1-P[FULL]) / P[REDUCED]/(1-P[REDUCED])

Here, P[FULL] is the probability of a full documentation type loan becoming 180 days delinquent in the 2-year time horizon. For logistic regression, it turns out that the odds ratio constructed on the values of one explanatory variable does not depend on the values of any of the other explanatory variables. The odds ratio can be used to get a sense of the importance of the characteristics in the models. For categorical variables (e.g. documentation type, property type), the odds ratio is calculated for each value relative to a base value. For example, condo vs. single family, PUD vs. single family, multi-family vs. single family for property types. For continuous variables, we can calculate the odds ratio of a specific change in the variable (e.g. 50 point FICO movement).

Origination Model Factors

Table 2 gives the odds ratios for the three models that forecast from origination. Note that an odds ratio greater than 1 indicates increased risk.

Scanning Table 2 for the largest and smallest values, one sees generally that FICO, LTV, and future equity are the three largest effects. Beyond these, specific values of variables present themselves as particularly good or bad. Low levels of documentation, interest only (IO), negatively amortizing (negam) loans, two-year hybrid ARMs, manufactured homes (MH), and investor properties present particularly high risk. Within the universe of ARM first-liens, hybrid ARMs with seven years or longer teaser periods present substantially less risk relative to shorter term ARMs.

Table 2. Origination Model Factors

Factor	Odds Ratio ARM, 1st Lien	Odds Ratio Fixed, 1st Lien	Odds Ratio CES 2nd Lien
FICO	2.5 (50 point decrease)	2.0 (50 point decrease)	5.9 (50 point decrease)
Origination LTV/CLTV	1.7 (90%->130%)	4.7 (90%->130%)	4.8 (90%->125%)
Future equity (2 years from as-of date)	1.7 ($45k to -$12k)	2 ($45k to -$12k)	1.25 ($45k to -$12k)
Product type			
Negam (relative to Amortizing ARM of same teaser)	2.5		
IO (relative to Amortizing ARM of same teaser)	1.5	1.6	
Balloon (relative to 1 month ARM)	1.1	1	
2-Year teaser (relative to 5/1 ARM)	2.1		
7-Year teaser (relative to 5/1 ARM)	0.6		
10-Year teaser (relative to 5/1 ARM)	0.5		
Documentation Type (Base = Full)			
Limited	1.3	1.3	1.7
Low/Easy	1.6	1.7	1.9
Reduced	1.8	1.8	3
Stated	2	2	1.8
Origination balance	1.7 ($150k->$350k)	1.6 ($150k->$350k)	0.8 ($40k->$80k)
Property type (Base = SFD)			
PUD	1	1	1
Condo	1.1	1.1	1.1
Multifamily	1.4	1.4	1.4
Co-op	1.2	1.2	
Townhouse	1	1	
Manufactured Homes	2	2	2
Occupancy (Base = primary residence)			
Second Home	1.2	1.2	1.8
Investor property	1.7	1.8	2.2
Loan purpose (Purchase vs. Not)	1.3	1.2	1.6
Growth rate in civilian labor force (MSA-Level)	0.9 (0%->3%)	0.9 (0%->3%)	
UPB to per capita income (MSA-level)	1.2 (move from 8x to 16x)	1.2 (move from 8x to 16x)	
Unemployment rate (MSA-level)	1.4 (5 point move)	1.2 (5 point move)	
Property State	1.6	1.6	1.8
Loan Vintage	1.6	2.1	1.5
Amortization term (40 Year vs. Not)	1.1	1.5	

The odds ratios indicate increased risk of certain attributes relative to the base characteristics. It is of note that they should be reviewed only within their respective columns (or asset types). Reading across columns will not produce meaningful comparisons. In addition, the odds ratio for continuous variables can only be shown here based on a select range. Ratios outside of these ranges will differ from what has been exhibited in the tables. For example, the effect on default probability of LTV moving from 60% to 100% is not the same as LTV moving from 90% to 130%.

On a small number of variables, DBRS revised the odds ratio (i.e. increased the penalty factor) from what was directly derived from the regression analysis. These variables generally represent truly adverse characteristics such as MH, IOs and negatively amortizing loans. It was done for two reasons. The population of MH loans in the whole dataset was somewhat limited. In the case of mortgages with payment shocks, the loans either haven't reached its payment reset date or the interest rate environment has been too benign for the full effect of payment shock to be seen.

Seasoned Model Factors

Table 3 gives the odds ratios for the seasoned loan models.

Table 3. Seasoned Model Factors

Factor	Current	Odds Ratio 30-60 Days DQ	90-150 Days DQ
Delinquency Status		2.2 (60 vs. 30)	2.1 (120 vs. 90)
			5.9 (150 vs. 90)
# times 30 Days*	1.3 (0 vs. 1)	1.1 (0 vs. 1)	
# times 60 Days*	1.8 (0 vs. 1)	1.3	
# times 90 Days*	2.2 (0 vs. 1)	1.4	1 (0 vs. 1)
Origination Score*	1.1 (2% to 4%)	1.1	
Future Equity (2-year from as-of-date)	1.4 ($57k -> $3k)	1.4 ($44k -> $0)	1.4 ($37k -> -$9k)
Future Change in Unemployment	1.5 (0% to 5%)	1.5 (-0.5% to 4.9%)	1.6 (-0.3%->5.2%)
Current UPB	1.2 ($100k->$325k)	1.3 ($50k->$190k)	1.3 ($150k->$350k)
IO flag	1.6	1.3	1.5
ARM flag	1.7	1.3	1.2
Balloon flag	1.9	1.4	1.3
Second lien flag	1.7	1.6	1.2
Bankruptcy flag	1.3	1.1	1.1
Foreclosure flag			1.3
Payment shock flag (Base=No payment shock event)			
Teaser period ends	1.3	1.1	
IO/Negam period ends	1.7	1.5	
Modification flag** (Base=No modification)			
Re-capitalization	1.3	1.5	
Rate reduction	1.2	1.2	
Loan age	0.5 (18->48 months)	0.4 (18->48 months)	
FICO 680 to 730***	0.7		
Multi-family vs. Single Family***	1.4		

There are several interesting things to note about the seasoned models. Firstly, the more delinquent the loan is, the fewer variables that are useful in explaining the behavior of the loan. Secondly, the majority of characteristics that don't change with loan seasoning (e.g. documentation type, occupancy) enter through the loan origination model. However, their impact on default probability diminishes as the loan ages or becomes more delinquent. By the time a seasoned loan is 90+ days delinquent, the origination score does not matter.

Modifications

For modified loans, DBRS generally needs at least two years of proven payment histories, post modification, to even consider their current status. For loans that have shorter than two years of history, even if they have remained performing, DBRS does not consider them to have demonstrated a consistently improved payment pattern, and therefore, their delinquency status will be reverted to their pre-modification status (unless their current delinquency status is worse than the pre-modification status, then their current delinquency will be used).

For modified loans that have been performing for two years or longer, a penalty is still warranted. In our analysis, we noticed increased risk of a modified loan relative to a loan that has not been modified, and such risk is more pronounced for re-capitalization (1.3 to 1.5x) than for rate reduction modifications (1.2x). Of course, existing performance data post modification has been limited so far. As servicers accumulate more modification data, DBRS will consider specific servicer's modification experience and performance data when evaluating pools, and note such considerations in the related transaction reports.

For ease of exposition, Tables 2 and Table 3 omit the interactions in the models.

THE TAIL MODEL

Once the probability of a loan becoming 180 days delinquent in the first two years of the forecast has been estimated, this must be projected into a life-of-loan value. The tail model is a key component of that calculation, as shown in Figure 3 earlier. Like all the models that make up the loss model, it is built using statistical techniques on the data from MBSData LLC.

The output of the tail model is a month-by-month *conditional* probability that the loan becomes 180 days delinquent. The model is conditional on two events:

1. The loan has not prepaid.
2. The loan has not already become 180 days delinquent. This is to avoid double counting. It treats being 180 days delinquent as an 'absorbing' state like default – a loan can enter only once.

The tail model takes the following inputs:

1. The delinquency score.
2. The age of the loan at the start of the forecast.
3. The age of the loan month by month.

The tail model was built using standard regression techniques applied to randomly selected pools of loans constructed to have varying levels of 180-day delinquent behavior. Approximately 63,000 monthly observations were produced. For each randomly assembled pool, the following characteristics are calculated:

1. Trailing 2-year 180-day delinquency rate of the pool (Delinquency Score).
2. The starting age of the pool.
3. The current age of the pool month by month.
4. The conditional 180-day delinquency rate month by month. This is the dependent variable in the regression.

Figure 4. Tail Model Shapes (D180 Shapes, Start Age = 24 Months)

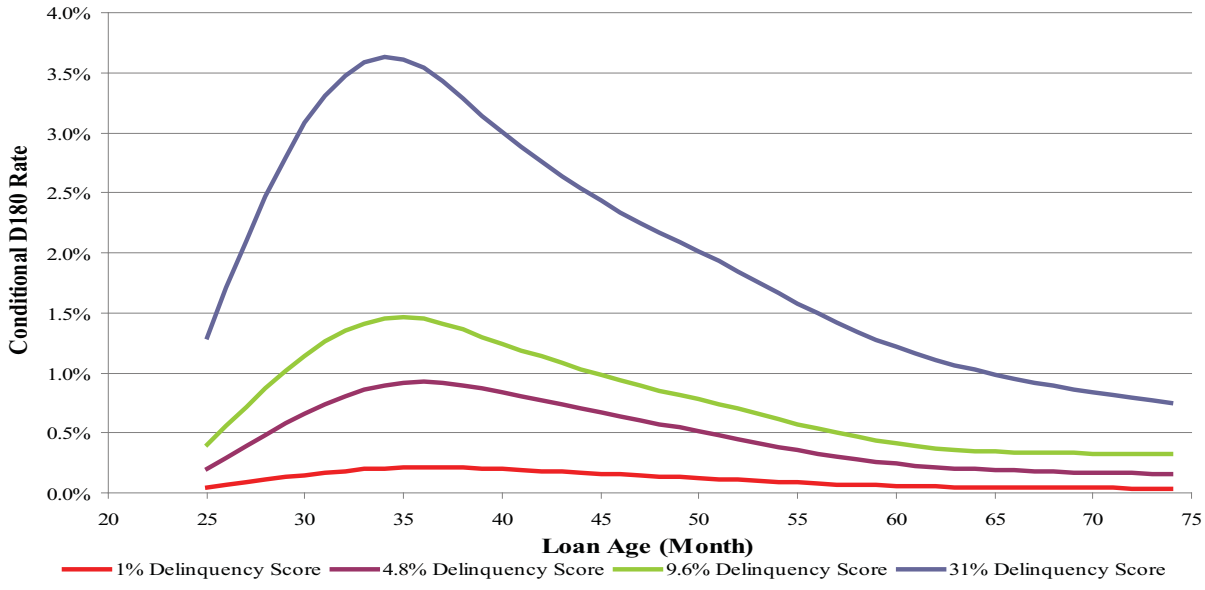


Figure 4 above shows the output of the tail model for a selection of delinquency scores for a pool that is scored from origination. Since the delinquency score gives the performance expectation for the first 24 months, the graphs start from month 25. Within each graph, the curves are plotted for delinquency scores of 31%, 9.6%, 4.8% and 1%. Firstly, you can see that Figure 4 shows a definite peak. This is because there is an age effect in the model.

While the tail model is a key component in producing the default forecast for years three and after, the calculation is more complex since this curve is conditional. To produce a default forecast for each month requires the expected balance present at that month. The expected balance present incorporates the following calculations:

1. The loan has not previously been 180 days delinquent.
2. The loan has not voluntarily prepaid.
3. The scheduled balance.

By default, the tail model assumes 0% voluntary CPR over the forecast horizon when calculating the *conditional* probability that the loan becomes 180 days delinquent. Depending on the product type and actual prepayment speeds of a securitized pool (prime loans typically prepay faster than subprime loans), the model allows users to input more realistic CPRs that will naturally reduce default occurrence for the asset pool.

Loss Severity

THE LOSS SEVERITY CONCEPT

The model described in this section applies only to first liens. For second liens, DBRS applies a severity of 100% plus six months of interest, if advanced by the servicer, calculated at the note rate. Severity is calculated indirectly via a recovery amount, which is the amount available to repay the loan – that is, it has netted out all the related costs at the time of liquidation.

Loss severity is calculated as follows:

1. A recovery value is estimated from the statistical recovery model.
2. Interest advancing (if desired) is subtracted from the recovery.
3. Loss is calculated as the shortfall of recovery to loan balance outstanding.

Just as with the default models, the loss severity model is constructed using statistical methods. Loan-level data on recoveries is joined to characteristics of the property. In the MBSData universe, there are over 1 million loans that have gone to loss. The modeling dataset consists of approximately 102,000 loans and an equal number held out for validation. Loans were stratified by liquidation year. The quantity that is estimated is the percentage of the updated appraisal that is recovered. The focus of the analysis is recovery from the sale of the house because this is the fundamental driver of losses.

THE RECOVERY MODEL

Forecasting the Updated Property Value at Liquidation

As a starting point, DBRS first needs current appraisals at the as-of date, which are the origination appraisals for new loans, and the current appraisals for seasoned loans[1]. This value is also known as *as-of date appraisal*.

In order to derive a recovery amount, one must first estimate an *updated property value at liquidation*. The projection is based on the following factors:

1. The number of months each subject loan takes to migrate through the delinquency, foreclosure and REO timeline. The length of this period will depend on how delinquent the subject loan is at the as-of-date. The estimation is further explained in the next section titled "Estimating Time to Liquidation".

2. DBRS home price forecast for this time period on a MSA-level. DBRS developed its own home price forecast model based on a data analytic approach. Using month-by-month Case-Shiller home prices

1. The RMBS Insight Model does have the capability to bring property values current for seasoned loans using Case-Shiller home price indices, but we would generally ask that these values be furnished to DBRS for the purpose of the rating.

to identify and calculate the regional peak-to-trough declines prior to 2000, DBRS selected counties that have experienced a two-year price increase prior to the peak of at least 10%, and a decline of 10% or more following the peak. The model then looks for consistencies in the length and severity of the decline to forecast future price drops from the most recent housing market peak. This model is further detailed in Appendix 3 "Peak-to-Trough Home Price Forecast Model".

3. Market value decline by rating category. DBRS applies a market value decline (MVD), ranging from 28% at AAA to 5% at B, to all rating levels, as detailed in the "Rating Categories" section later on.

From here, the percentage of this updated property value that will be recovered is estimated via the Recovery Percentage statistical model.

Distressed Sale Discount

First, a 30.8% haircut is applied to the updated property value. This haircut is meant to address property sales in a liquidation scenario, which often represent distressed sales and therefore beaten-down prices. The value, one of the terms of the recovery model, has been estimated from past liquidations. In addition, the haircut also includes liquidation costs such as maintenance, repairs, attorney and real estate agent fees, etc.

Further Property Value Adjustment

Once the distressed sale discount is applied, further value adjustments, calculated based on the updated property value, are made based on the following characteristics. These adjustments are generally negative.

1. Expensive and inexpensive properties.
2. Months in REO.
3. Property type.
4. Occupancy.
5. FICO.
6. Months since loan origination.
7. Property State.

These adjustments are made because each of them has a significant impact to the actual recovery percentage. Based on our analysis, each month in REO reduces the recovery amount by 1.8%. Months in REO are a user-specified input, which DBRS assumes to be six months by default in the current real estate environment.

Expensive and inexpensive properties tend to recover less as a percentage of updated property value. Two property types are called out as different: MH and multi-unit, each of which produces lower recoveries. Strictly speaking, the rest of the listed characteristics aren't property characteristics; however, they do impact the recovery value in our dataset. Investor homes and second homes have reduced recovery rates. Homes associated with higher-FICO borrowers have improved recovery rates. Recovery declines with increased time since loan origination. Additionally, a handful of States (OH, IL, PA, MI) had reduced recovery rates.

If mortgage insurance is present, the model will add back the amount of the insurance coverage, subject to a haircut of 33%. The 33% value, on of the terms of the recovery model, has been estimated from past liquidations. To the extent actual rescission rates provided to DBRS are different from the assumed 33%, or when DBRS deems that different stresses are warranted due to mortgage insurance companies' historical rescission experience, this haircut rate can be adjusted.

Table 4 below shows a simplified example of "AAA" and "B" loss severity calculation with assumed characteristics. In this hypothetical example, the projected HPA is assumed to be -7% as estimated by our Peak-to-Trough Forecast Model, actual home price forecast varies by MSA. Also interest advances are not considered for the purpose of this example.

Table 4. Loss Severity Calculation - A Simplified Example*

	"AAA" Loss Severity	"B" Loss Severity
Property Value at Origination	$ 250,000	$ 250,000
Less: Projected HPA = -7%	$ (17,500)	$ (17,500)
Less: MVD by Rating Category ("AAA": 28% / "B": 5%)	$ (65,100)	$ (11,625)
Updated Property Value at Liquidation	**$ 167,400**	**$ 220,875**
Distressed Sale Discount (-30.8%)	$ (51,559)	$ (68,030)
Further Property Value Adjustments		
1) Expensive and inexpensive properties:	$ (7,777)	$ (1,467)
2) Months in REO: Six months	$ (17,075)	$ (22,529)
3) Property type: Single family	$ -	$ -
4) Occupancy: Investor property	$ (15,655)	$ (20,656)
5) FICO: 700	$ 16,405	$ 21,646
6) Months since loan origination: 18 months	$ (7,700)	$ (10,160)
7) Property State: California	$ -	$ -
Property Resale Value	$ 84,038	$ 119,679
Unpaid Principal Balance (UPB)	$ 200,000	$ 200,000
Loss Amount (UPB less Property Resale Value)	$ 115,962	$ 80,321
Loss Severity (Loss Amount / UPB)	**58%**	**40%**

** Interest advances are not considered for the purpose of this example.*

ESTIMATING TIME TO LIQUIDATION (FOR CALCUATING AN UPDATED PROEPRTY VALUE AT LIQUIDATION)

In order to calculate an *updated property value at liquidation*, the model needs to project how long it takes for liquidation to happen. Liquidation timeline varies for loans in different delinquency status. The closer a loan is to REO, the shorter it takes to be liquidated. DBRS estimates *updated property value at liquidation* as follow:

For loans that are already in REO:

1. Use the user-specified months in REO
2. Bring the *updated appraisal* to that date

For loans that are 180 days delinquent but are not yet in REO:

1. Take the state-by-state timeline to REO, adjusting for current level of delinquency.
2. Add the user-specified months in REO.
3. Bring the *updated appraisal* to that date

For loans that are under 180 days delinquent:

1. Month-by-month, take the monthly estimate of the probability the loan goes D180,
2. Add the state-by-state timeline to REO,
3. Add the user-specified months in REO.
4. Bring the *updated appraisal* to that date

For loans under 180 days delinquent, it is more complex to project a time to liquidation because one does not know when exactly a loan will default. In this case, DBRS projects a liquidation timeline (for the purpose of deriving an updated appraisal) every month based on our estimation of monthly probability of a loan becoming 180 days delinquent, as detailed in the “The Tail Model” section.

STATE-BY-STATE TIMELINE FROM CURRENT TO REO

DBRS used a unique method in estimating the state-by-state timeline. We did not limit the scope of the review to only loans that have reached REO because there is a large inventory of delinquent loans that have not yet done so and as a result, such a calculation would be biased on the low side. Likewise, choosing a static pool that has had sufficient time to fully move to REO would mean using data that is so old that it does not appropriately reflect what is currently happening in the market. Instead, the DBRS method uses the most recent data possible to derive the monthly rate at which loans move to REO and then calculates the average timeline based on those rateThe expected time to REO is calculated from a state-specific hazard curve that is derived from the MBS Data LLC database. The hazard curve gives the conditional probability a loan moves into REO the k^{th} month since it became 180 days delinquent (D180) given it has not done so prior to that month. The most recently available data was used to calculate the probabilities of the hazard curve. For instance, we started within the universe of loans that became D180 in 2010. In this dataset, there is generally sufficient data today to calculate the probability a loan moves to REO in the first six months since the loan becomes 180 days delinquent. There is no data yet today on a D180 loan moving to REO on the 24^{th} month. Hence, we had to expand the universe to loans that became D180 prior to 2010 to fill in the dataset. Once the hazard curve is calculated, the average time a loan takes to move to REO is calculated. Any loans that have not moved to REO by month 43 are flushed out of the pipeline.

All loans that became 180 days delinquent during 2010 are used. When calculating the probability of moving to REO for month *k* since the loan became D180, the number of loans that still have not done so already is found. If this is not at least 1000 loans, loans that became D180 during 2009 are folded into the analysis until at least 1000 loans are available. If there are still not 1000 loans available for the analysis, loans that became D180 during 2008 are added to the dataset. In this way, the need for data is balanced with the desire for the data to be as recent as possible.

Table 5. State-by-State Timeline From Current to REO

State	Months		State	Months		State	Months		State	Months
AL	22		ID	20		MS	25		PA	28
AR	23		IL	26		MT	23		RI	25
AZ	16		IN	24		NC	24		SC	24
CA	22		KS	22		NE	21		TN	24
CO	21		KY	25		NH	24		TX	24
CT	28		LA	28		NJ	30		UT	23
DC	25		MA	27		NM	25		VA	22
DE	29		MD	26		NV	19		VT	27
FL	26		ME	28		NY	32		WA	25
GA	20		MI	16		OH	23		WI	24
HI	26		MN	21		OK	24			
IA	25		MO	19		OR	24		**US***	**24**

** Insufficient data in the States that are missing from this table. The US average assumed for these states.*

Once the D180 to REO timelines are calculated, we added 6 months to the results to capture the period from current to D180. Table 5 gives the resulting number of months from Current to REO by State based on DBRS estimate derived above. The months from Current to REO can be adjusted if actual timelines are extended or reduced, or when DBRS deems that additional stresses are warranted. Such option is available as a user input field.

INTEREST ADVANCING

If the servicer will be advancing interest in a securitization, interest advancing at the note rate will be included in the loss calculation. Unless otherwise specified that the servicer will only be advancing for a certain period of time (for example up to 60 days), the number of months interest is advanced will by default follow the state-by-state timeline from current to REO.

Table 5 above defines the state-level timeline at our "B" base case. DBRS varies these base timelines by rating category. For each rating level higher than a "B", two incremental months will be added to the timeline of the previous rating category.

LOSS SEVERITY FOR FHA LOANS

FHA loans are insured by the Housing and Urban Development (HUD). Their loss severity calculations differ from that of a traditional mortgage, and are analyzed based on the insurance coverage by the HUD. Once a FHA loan defaults, the servicer submits a claim to the HUD for reimbursements. A claim can be reimbursed or denied. DBRS generally assumes a portion of the claims will be denied based on servicer's historical denial rates. If a loan is denied, DBRS treats the loan as if there is no insurance and loss severities will be calculated assuming it is a traditional mortgage.

If Claims Are Paid

If a claim is reimbursed, the FHA insurance typically covers 100% of the outstanding principal balance and a substantial portion of the interest and foreclosure costs. The HUD reimbursements do not cover the following:

1. Interest payments for 60 days.
2. Approximately 1/4th to 1/3rd of the foreclosure expenses depending on the servicer's rating with the HUD, and
3. The difference between the interest accrued at the note rate and the debenture rate during the liquidation process.

DBRS analyzes each of the three categories of proceeds not reimbursed by the HUD, the sum of which equals the loss amount at the "B" base case. Loss amounts are stressed assuming longer FHA timeline and increased claim denial rate for each higher rating category, as detailed below.

1. Interest payments for 60 days at the current note rate of the loan.

2. Approximately 1/4th to 1/3rd of the foreclosure expenses depending on the servicer's rating with the HUD – DBRS usually assumes a 1/3rd of the foreclosure expenses will not be reimbursed because servicer's rating with the HUD may change in the future. Assuming a 1/4th quotient may be underestimating the costs to the extent the servicer rating is downgraded. DBRS uses the same foreclosure (or liquidation) expenses as described in the "Recovery Model" section. Recovery for FHA loans is augmented by 2/3 of a value of fixed costs consistent with that seen in the data.

3. During the period between the loan default to the claim date, the difference between the interest accrued at the mortgage note rate and the interest accrued at the debenture rate, to the extent the mortgage note rate exceeds the debenture rate. A loan is in default if the borrower fails to make a payment and such failure continues for a period of 30 days.

   FHA Timeline (From Loan Default to Claim Date)

   The servicer on the transaction furnishes, to DBRS, the state-level FHA timelines based on FHA loans in its own portfolios[2]. We then apply further delays to these timelines by rating category, as specified in Table 6 below.

2. These servicer-furnished state-level FHA timelines do not necessarily conform to the DBRS state-level timelines.

Table 6. Delays to Servicer Timeline By Rating

Rating Category	Delays to Servicer Timeline (Months)
AAA	16
AA	14
A	12
BBB	10
BB	8
B	6

Debenture Rate

The debenture rate is based on the United States Treasury securities adjusted to a constant maturity of 10 years. For loans originated before January 23, 2004, the debenture rate applicable to a claim is the higher of the rate in effect on i) the date the loan was endorsed for insurance, or ii) the date the commitment to insure the loan was issued. The debenture rate applicable to a claim for loans endorsed for insurance after January 23, 2004 is based on the debenture rate in effect at the month in which the default on the loan occurred.

For loans originated before January 23, 2004, or post January 23, 2004 but have defaulted already, DBRS uses the published debenture rates for the applicable dates. For any performing FHA loans endorsed after January 23, 2004, DBRS stressed debenture rates in accordance with the DBRS methodology on interest rate stresses – Unified Interest Rate Model for U.S. RMBS Transactions. Please refer to the Unified Interest Rate Model for U.S. RMBS Transactions for more detail of the interest rate stresses applied by DBRS.

If Claims Are Denied

HUD can fully deny or curtail FHA claims for different reasons that include missing insurance certificates, excessive damage to properties, title issues, any deviation in practices by the originator or servicer from the program guidelines, late due diligence, late conveyance, late title package, etc.

DBRS reviews the historical claim denial rates for the servicer on the transaction to determine the "B" base case stress. Multiples at the AAA rating level range from 4.0 to 6.0 times the base case denial rates. Such variations in multiples are dependent on the operational assessment of the servicer and a review of third-party due diligence. The latter includes an analysis of servicer's compliance with minimum standards under the FHA guidelines.

Loss severities for a denied loan will be calculated in the same way as a traditional mortgage with comparable loan characteristics.

Combining Claims Paid and Denied

For each FHA loan, DBRS estimates two sets of loss severities assuming a claim is either paid or denied. A final loss severity is calculated giving weights to the denial rate at each rating category. For example, if the loss severity for a loan is estimated at 60% without FHA insurance and 10% with insurance, and the assumed denial rate equals 5% at a "B" base case. Then the final loss severity at B for this FHA loan will be 12.5% (60% x 5% + 10% x 95%).

LOSS SEVERITY FOR VA LOANS

VA loans are insured by the Department of Veteran Affairs (VA). Like FHA loans, their loss severities are also analyzed based on the insurance coverage. The VA insurance covers losses up to certain limits depending on the outstanding balance of the defaulted loan, as indicated in Table 7. The guaranty limits for the VA loans are as follows:

Table 7. VA Guaranty

Loan Amount	VA Guaranty
< $45,000	50% of Loan Amount
$45,001 to $56,250	$22,500
$56,251 to $144,000	40% of Loan Amount
$144,000 to $417,000	25% of Loan Amount
> $417,000	The lesser of a) 25% of the VA county loan limit or b) 25 % of the Loan Amount

Estimating loss severities for VA loans are done in a similar manner as for FHA loans. At the "B" base case, the loss amount equals the proceeds not covered by the VA guaranty, as set forth in Table 7. Increased claim denial rates are assumed for higher rating categories. Finally, DBRS combines the loss severities for claims paid and denied based on the respective denial rate at each rating level.

Shrinkage, Concentration Risk and Small Pools

SHRINKAGE (OR DEAL ADJUSTMENT)

The scoring models incorporate data about the loan, borrower characteristics and economic data. Interestingly, there is an additional piece of information that can be considered. That information is the mean score of the portfolio. Figure 5a shows the actual versus estimated 2-year 180-day delinquency rate for 3,289 deals comprised of 9.9 million loans scored from origination (Origination Score). Figure 5b is the corresponding graph for 3,045 deals comprised of 3.4 million loans scored at 30 months of seasoning (Behavioral Score). Examination of the graphs shows that estimates for deals with high expected 180-day delinquency rates tend to come in under the actual rate. It is also the case that deals with low expected 180 delinquency rates tend to come in over the actual rate. This phenomenon does not represent a general issue with the score as it stands. Figure 6a shows the decile plot of actual versus estimated 180-day delinquency rate of the origination score constructed at the loan level for these deals. Figure 6b shows the same plot for the behavior score. Both graphs are satisfactory. Rather, it seems that the action of assigning loans to deals produces the effect. That is, other than loan characteristics, there must be information in the assignment process that drives the performance differentials.

Simply put, "good" loans (loans with good collateral attributes) in a subprime pool tended to perform worse than if the same loans were included in a prime pool. The worse performance is suspected to at least be partially driven by the assignment process (of these loans into a subprime pool) which may be a reflection of looser underwriting standards. The opposite is also true. When a "bad" loan showed up in a prime pool, it tended to exhibit better performance than if it was included in a subprime pool. The loan may represent an "exception" to the underwriting process that underwent additional scrutiny.

Figure 5a. Origination Score

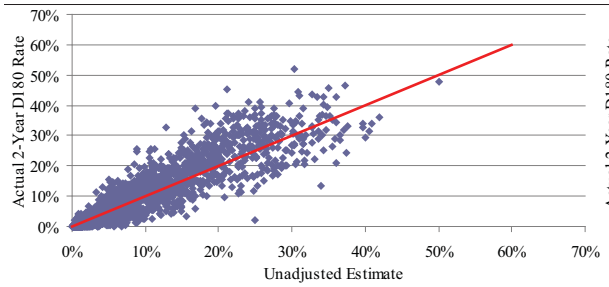


Figure 5b. Behavioral Score

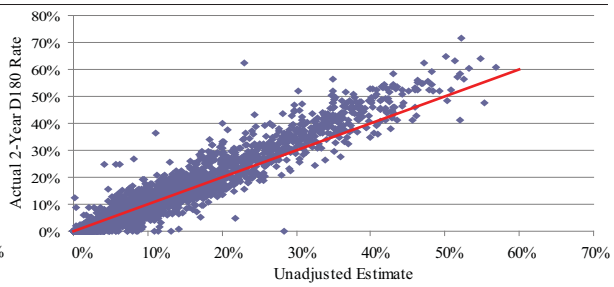


Figure 6a. Decile Plot of Origination Score

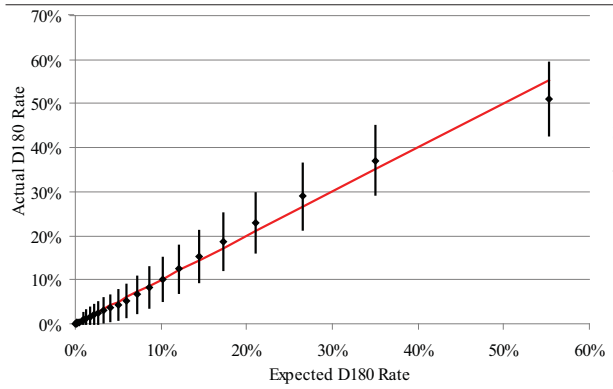
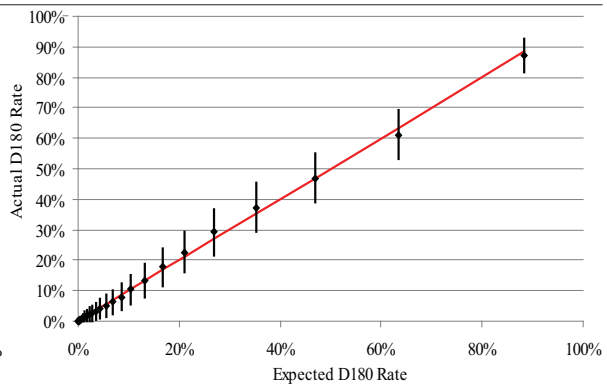


Figure 6b. Decile Plot of Behavioral Score



The solution is to fit a model that incorporates information about the deal. This is done through the use of the deal average score. A loan-level logistic model that has two factors is fit. The two factors are the log odds score of the loan and the log odds average score of all the loans in the deal. Figure 7a shows the actual versus estimated 180-day delinquency rate for the 3,045 deals scored from origination after the adjustment; Figure 7b shows the corresponding graph for the behavioral model. There is a distinct reduction in the deal-assignment affect.

Figure 7a. *Adjusted* Origination Score (after shrinkage)

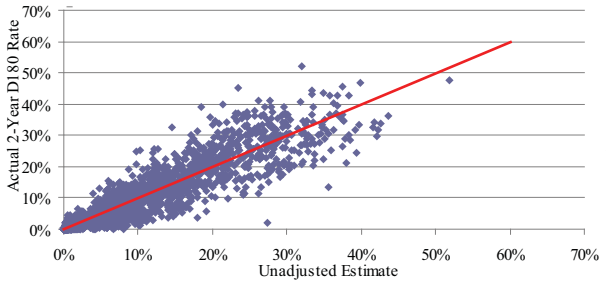
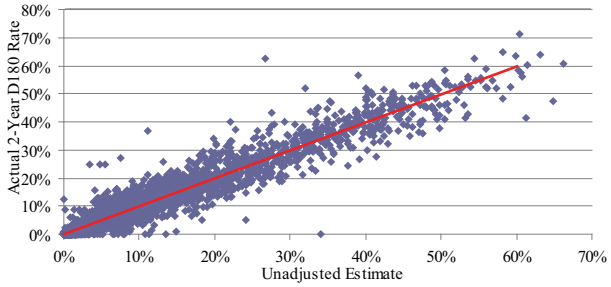


Figure 7b. *Adjusted* Behavioral Score (after shrinkage)



Applying this shrinkage factor in transactions pulls each loan closer to the average. A "good" loan in a subprime deal may not deserve the credit it would otherwise have received. Conversely, a "bad" loan in a prime deal may not be as bad as its collateral attributes have suggested.

CONCENTRATION RISK IN LOAN SIZE AND GEOGRAPHY

The risk presented by concentrations is that of an increased chance of loss exceeding the expected level rather than an increase in the expected level of loss. As such, the effect of concentration risk appears in the BB to AAA rating levels and not the B level estimates. The level of concentration is a key factor determining the level of asset correlation which, in turn, is an important factor in the determination of rating levels.

In RMBS Insight, concentration is measured by a Herfindahl index calculated on both a geographic (MSA level) and loan-size basis. The asset correlation model is a parametric model which is a function of the two concentration measures and credit quality. The parameters are fit from data. The data consists of the scoring model output (Delinquency Score Model) and the actual outcome of 2891 deals.

SMALL POOLS

For securitizations consisting of fewer than 300 loans, RMBS Insight incorporates a small pool adjustment. The rationale is that small pools are more sensitive to certain large loans incurring losses and therefore may exhibit a risk in excess of the model estimate.

The following steps are performed in order to build in a degree of safety against small pools. At the "B" rating level:

1. The 75th percentile of the 2-year D180 distribution is calculated.
2. The 2-year D180 rate is the weighted average between the unadjusted value and the 75th percentile value.
3. The weighting is linear between 100% weight to the 75th percentile for a portfolio of 100 loans (or less) to 0% at 300 loans.

For higher ratings categories, the target percentile is increased.

Rating Categories

In RMBS Insight, the approach to ratings categories has two components: one based on identifiable risks and the other based on unidentifiable risks.

IDENTIFIABLE RISK

Identifiable risks are those related to variables that are incorporated into the loss model. For these risks, it is a straightforward analysis to gauge the effect on the forecast to changes in the input variables. The effect of most of the variables on the forecast is uninteresting from the standpoint of ratings categories since their values are known with certainty. Origination LTV, FICO and documentation type are such examples. There are other inputs, however, whose values are forward looking. The primary forward-looking variables are derived from house prices. The default models and the loss severity (or recovery) model include variables that are functions of future house values. In the case of the default models, the future value of the property is used to calculate the future owner's equity. In the case of the recovery model, future house value is used directly.

Associated with each rating category is a market value decline scenario, as exhibited in Table 8. All future house values are adjusted downward by this percentage. The adjustment is applied in addition to a) the peak-to-trough home price forecast scenario, b) distressed sale discount and c) further property value haircuts by property and loan characteristics as described in the loss severity section. The distribution of the average peak-to-trough decline can be found from the peak-to-trough model and incorporating the observed contemporaneous correlation in the series. The MVD values for the ratings categories are percentiles of this distribution.

Table 8. Market Value Decline by Rating Category

Rating Category	Market Value Decline*
AAA	28%
AA	25%
A	20%
BBB	15%
BB	9%
B	5%

** The market value declines by rating category are applied in addition to:*
a) Peak-to-trough home price forecast.
b) Distressed sale discount of -30.8%.
c) Further property value haircuts by property and loan characteristics.

UNIDENTIFIABLE RISK

Even if all the inputs to the model, such as house prices, are known, there is still variation between the estimates and the actual values. An examination of Figures 7a and 7b in the "Shrinkage" section makes this clear.

There are a number of causes of variation between the estimate and the actual:

1. Uncertainty in the model coefficients.
2. Inherent variability in portfolio outcomes.
3. Model misspecification and incomplete or incorrect data.
4. Model drift.

A traditional confidence interval around an estimate focuses on Cause 1 and makes statements about the unknown mean portfolio loss rate. Confidence intervals are of little interest in this setting. The focus of interest is not making statements about the mean portfolio outcome but the single outcome of the portfolio at hand. Making statements of this nature involves incorporating Cause 2. Such statements are referred to as prediction intervals. An example of a confidence interval is a statement like: "A 95% confidence interval for the mean home size in the United States is 2650 to 2750 square feet." An example of a prediction interval is a statement like: "A 95% prediction interval for the size of a house whose address is randomly selected from the tax rolls is 2500 to 2900 square feet." Prediction intervals are wider then confidence intervals.

Any model is an abstraction of reality. It is a simplification based on incomplete data. Simplification necessarily introduces error. Error is also introduced as the values of relevant variables that are not captured vary. These are examples of Cause 3. It is also common for the relationships captured in the model to change over time. This is referred to as model drift – Cause 4.

These risks are referred to as unidentifiable. Though unidentifiable, they can, to varying degrees, be quantified. Methods to handle Causes 1 and 2 are well known. The philosophy behind quantifying Cause 3 is this: that the error relates to processes by which loans are originated and chosen to be included in deals as well as uncaptured regional economic effects. The combined effect of these processes manifests itself as an observable correlation of defaults within a deal.

Appendix 5 "Rating Category Models" details the models DBRS uses to derive the rating categories. They are:

1. Peak-to-trough model of house prices (to address the identifiable risk).
2. D180 correlation model (to address the unidentifiable risk).
3. Recoveries correlation model.

Re-securitizations (or ReREMICs)

SUMMARY

RMBS performance deterioration has triggered a trend in mortgage securitization: the use of re-securitizations (or ReREMICs) as a restructuring tool. Following substantial downgrade actions in recent vintages, the surge in ReREMICs was primarily motivated by the desire to create securities with increased credit support to ensure rating stability and improved liquidity.

Typically, a ReREMIC is viewed as a pass-through of interest, principal and losses from one or more underlying certificates to a newly created ReREMIC. Recent ReREMICs, frequently backed by originally AAA-rated underlying certificates, often employ a simple A/B (or senior/subordinate) structure, with Class B providing additional credit support to Class A via subordination. In most ReREMICs, interest payments on Class A and B are distributed on a pro-rata basis and principals are paid sequentially.

RATING APPROACH

When rating ReREMICs, DBRS uses RMBS Insight to assess the probability of default, loss severity and expected losses on the underlying pool, as described in previous sections.

Furthermore, ReREMICs are often backed by seasoned and distressed underlying transactions issued in 2005 to 2007. In most cases, the origination and underwriting process, representations and warranties and due diligence reviews within the transactions were weak in quality. A portion of these qualitative risks, along with servicing capability, are manifested in deal performance over time, and are therefore captured through the seasoned characteristics by our model. Additional haircuts on FICOs, appraisals, mortgage insurance and slower prepayment speeds may be warranted to address these risks on seasoned loans.

A cash flow analysis is always performed for ReREMIC ratings, as detailed in the next section.

CHALLENGES AND CONCERNS

Rapid deterioration in the housing market and a bleak economic outlook have made it challenging to rate certain ReREMICs. DBRS renders the following types of ReREMICs not ratable.

- Underlying bonds backed by second liens and HELOCs
- Underlying bonds backed by pools with loan count lower than 200

In situations where no updated borrower information is available or when property values have declined significantly, it is very difficult to predict borrower behavior in second liens and HELOCs, even if they are currently performing. Nor can one ascertain the expected losses in pools with loan count lower than 200, for the tail risk and performance volatility.

Certain other types of ReREMICs may be ratable, however these ReREMICs may not warrant the highest ratings from DBRS.

- Underlying bonds with a class factor of 1 (often times non-front-pay seniors) with high delinquencies and losses.
- Underlying pools with high loss expectations (most subprime and some Alt-A transactions).

In a ReREMIC, DBRS cash flow analysis considers how fast an underlying bond is paying down relative to how rapidly the losses are being applied from the bottom of the capital structure. A bond with a class factor of 1, so far locked out from principal distribution, is far more sensitive to cash flow assumptions than a front-pay senior. When evaluating bonds with a factor of 1, DBRS will determine how long it will take for such a bond to start receiving principal under various prepayment scenarios. Typically a bond that will not start to receive principal within 2 years may not warrant the highest ratings, especially if the transaction is experiencing high delinquencies and losses.

Additionally, for underlying transactions with high loss expectations, it is often not possible to achieve the highest ratings after applying conservative cash flow assumptions.

Finally, DBRS does not assign ratings below "A" in any ReREMICs, due to the sensitivities to performance volatility at the lower rating categories.

Servicing Practices and Their Impact to Interest Payments

Since a ReREMIC is a pass-through of interest, principal and losses from the underlying certificates, its interest entitlement is usually capped at the actual interest amount collected on the underlying securities. In other words, a ReREMIC trust can not pay out more interest than it receives from its collateral, and sometimes, what is collected on the underlying securities can be as low as zero.

When rating ReREMICs, DBRS is assessing the ability of the trust making the full principal payment by the legal final maturity date of the transaction. These transactions typically define interest rate as the lesser of the bond coupon and the available interest funds. Hence, the DBRS rating does not provide an opinion on the timeliness or amount of interest payments the investor may receive. The trust's only obligation is to pass through the interest proceeds net of fees from the underlying securities.

Continued deterioration in securitization performance has prompted changes in servicing practices that were not anticipated pre-crisis. Loan modification, mostly in the form of interest rate reduction, was a loss mitigation technique meant only for a limited number of distressed borrowers, not as a solution to colossal defaults as it is today. In addition, large scale modifications often allowed servicers to recoup past servicing advances at the top of the waterfall, reducing the interest amount distributable to the bond holders. Finally, driven by unprecedented level of delinquent mortgages and extending foreclosure timeline, a declining trend in servicing advances have been observed and will most likely continue in the foreseeable future. Consequently, ReREMIC investors these days are more likely to experience lower interest receipts for reasons described above.

Transaction Structure and Cash Flow Analysis

TRANSACTION STRUCTURE

RMBS transactions are typically structured into credit tranches, representing varied credit risk ranging from AAA (seniors), AA to B (subordinates). The following are typical structures and features in RMBS transactions.

Pure Sequential and Pro-rata Structure (Without Triggers)

In a sequential pay structure, all incoming principal cash will be used to pay down the AAA classes. The subordinate bonds are "locked out" from any principal payments until the seniors are paid in full. This ensures increased credit support for the AAA bonds. In a pro-rata structure, subordinates pay down concurrently with the seniors, resulting in a reduction in the absolute amount of subordination to the senior classes.

Shifting Interest Structure

In a shifting interest structure, scheduled principal is allocated to all classes on a pro-rata basis. Unscheduled principal (or prepayments) however, is distributed based on a schedule. For years after issuance, in addition to its own allocation of prepayments, the senior classes are also entitled to a percentage of the subordinates' share of prepayments. The entitled percentage steps down with time, until zero, provided if the transaction is performing well, as measured by delinquency and loss triggers. Shifting interest structures are often utilized in prime (and some Alt-A) securitization.

Senior Subordinate and Over-collateralization (Sr-Sub OC) Structure

In non-prime transactions, loans bear higher interest than their prime counterparts to compensate for the greater credit risk. The higher rate usually results in a sizeable strip of excess cash (or excess spread), after paying bond coupons and other fees. Excess spread is used to pay additional principal to the bonds on top of the principals actually received on the collateral, thus creating overcollateralization (OC).

In a Sr-Sub OC structure, principal payments are usually allocated sequentially to the senior and subordinate classes. Such allocation continues until the step down date. Principal will be distributed pro-rata among all classes at such date, provided that the transaction is performing well. At that time, OC is also allowed to step down subject to an OC floor.

Triggers

Triggers are important as they may alter principal allocations in a transaction. In a Sr-Sub OC structure, trigger may also impact the OC size and therefore the level of credit support. Triggers are usually tied to delinquency, in the form of a rolling 60+-day delinquency rate, and cumulative losses.

Loss Allocation

In a RMBS transaction, losses are first absorbed by excess spread and overcollateralization (when applicable), followed by the non-rated class (if any), and finally reverse sequentially from the lowest- to the highest-rated bonds. Once the subordinates are written down, loss allocation is typically pro-rata among all the senior classes.

CASH FLOW ANALYSIS

For transactions that may be impacted by cash flow stresses[3], RMBS or ReREMICs, DBRS undertakes a detailed structural analysis (currently in Intex) to ensure timely payments of principal and interest to the bonds. The cash flow modeling assumptions DBRS uses for rating RMBS transactions focus on the following risk factors:

1. Prepayment speeds
2. Timing of losses
3. Interest rate stresses (when there is a mismatch between the collateral and bond coupons)

The complexity of the capital structures in RMBS transactions requires testing various combinations of cash flow stresses to properly analyze a bond. DBRS incorporates a dynamic cash flow analysis in our rating process. As indicated in Table 9 below, a baseline of five prepayment scenarios (under two Intex conventions – Standard and Max[4]), two loss timing curves and two interest rate stresses are generally applied to test the resilience of a bond. An appropriate rating is one that can withstand the combination of DBRS-modeled cash flow stresses without the rated class incurring any interest shortfalls or principal writedowns. As warranted, transactions may be further stressed to include weighted average coupon (WAC) deterioration as well as delinquency vectors to test the impact of triggers. DBRS generally runs 40 scenarios in each rating category to test the sensitivity of the rated securities to various cash flow stresses.

3. Certain transactions may not be affected by cash flow stresses. These structures are typically sequential-pay, without triggers and the principal and interest waterfalls are kept strictly separate.
4. Standard: The standard prepayment rate consists of voluntary prepayments only. Prepayment amount and default amount are applied to the loans independently. Max: Intex will first apply the defaulted amount, then apply the prepayment amount such that the total amount applied is equal to the larger of the prepayment or the default amount.

Table 9. DBRS Base Cash Flow Scenarios

Scenario	Prepayments	Intex Prepayment Convention	Loss Timing	Interest Rate*
1-5	5 - 25% CPR	Standard	Front-loaded	Upward
6-10	5 - 25% CPR	Standard	Front-loaded	Downward
11-15	5 - 25% CPR	Standard	Back-loaded	Upward
16-20	5 - 25% CPR	Standard	Back-loaded	Downward
21-25	5 - 25% CPR	Max	Front-loaded	Upward
26-30	5 - 25% CPR	Max	Front-loaded	Downward
31-35	5 - 25% CPR	Max	Back-loaded	Upward
36-40	5 - 25% CPR	Max	Back-loaded	Downward

** Where there is a mismatch between the collateral and bond coupons.*

This section will examine each risk factor and how it affects collateral and bond cash flow.

PREPAYMENT SPEEDS

Prepayment speed measures the rate at which borrowers make their principal payments prior to the scheduled maturity date. In a shifting-interest structure, high prepayment speeds allow subordinate bonds to pay down quickly thus reducing the absolute amount of credit support they provide to the senior classes. Such scenarios, when combined with a back-loaded loss timing curve, are especially precarious for the outstanding senior bonds. In addition, prepayments reduce the outstanding principal balance of a mortgage pool, thus reducing excess spread. The faster the prepayment speeds, the quicker excess spread is depleted.

Interest Rate Movements and Refinance Tendency

Historical data shows a correlation between a borrower's prepayment behavior and interest rate movements. Generally, in a declining interest rate environment, borrowers are motivated to refinance and may do so if their credit profile allows. Conversely, prepayment speed typically slows as interest rates rise.

The recent housing and economic crises have created an interesting phenomenon. Despite the historically low interest rates, voluntary prepayments, particularly in the non-agency market, remain extremely low. Faced with blemished credit histories, insufficient home equity or tougher underwriting standards, many existing borrowers find it difficult to refinance.

Payment Shock after Reset

After the reset date, prepayment behaviors can vary by product type. For example, interest rates on hybrid ARMs may increase substantially. Due to payment shocks that can occur as the rate resets from the initial fixed rate, borrowers are more likely to prepay their mortgages at or shortly after the respective reset dates. Again, this observation may not hold true in an environment where refinancing options are limited.

Dynamic Prepayment Curves

The current low prepayment environment presents a challenge in stressing RMBS transactions as slow speeds could lead to overly optimistic valuations of excess spread. Conversely, high prepayment speeds stress excess spread properly, but may also deplete collateral too quickly to allow 100% of the expected losses to pass through the capital structure. As such, DBRS finds it prudent to apply a dynamic prepayment stress.

In a typical transaction today, DBRS applies five prepayment stresses (under two Intex prepayment conventions) that generally range from 5% to 25% CPR. As expected, these speeds will be adjusted or expanded should the overall prepayment environment change. The stresses will also be validated against issuers' actual prepayment experience for each type of transaction. For example, prime transactions generally prepay faster than Alt-A and subprime pools. Depending on future economic and housing environments, adjustments will be made as needed to shift the speeds faster or slower.

TIMING OF LOSSES

The timing of losses is a key factor in cash flow analysis. In most transactions the servicers generally advance the principal and interest (P&I) payments on delinquent mortgages, so DBRS assumes that defaults and losses will occur simultaneously.

Depending on which part of the capital structure is being stressed, faster or slower realization of losses can have a different impact on the bonds. For example, when stressing certain non-accelerating seniors (NAS)[5], front-loaded losses may deplete credit enhancement faster, but may also cause all subordinated bonds to be written off sooner, triggering the NAS bond to emerge from its lockout period prematurely and start paying down sooner.

Traditionally, a loss curve spans over seven to 10 years, the bulk of the losses happen between years two and five. During the most recent housing crisis, it is not uncommon to observe a more back-loaded loss timing pattern, particularly for 2005 and prior vintages. Many of these loans did not incur losses until well into their 5th to 7th years. To capture such sensitivities, it is imperative to test multiple loss timing curves when rating a transaction.

DBRS usually estimates two base loss timing patterns for a new origination pool: front- and back-loaded curves, as shown in Figure 8a below. These curves illustrate how losses will be distributed throughout the life of a transaction, generally 10 years. The area under each curve adds up to 100%.

Figure 8a. DBRS Loss Timing Curves (New Origination Pools)

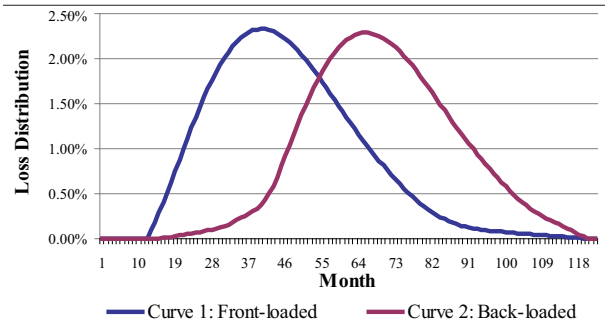
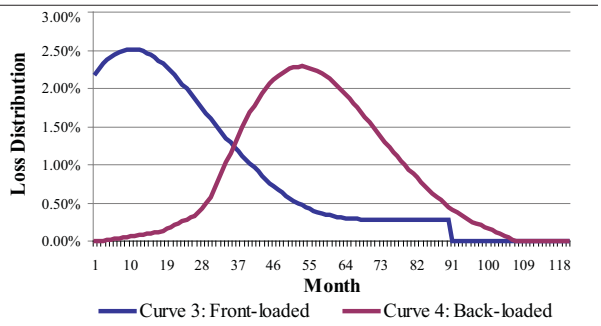


Figure 8b. DBRS Loss Timing Curves (30-Month Seasoned Pools)



For seasoned transactions, DBRS also estimates two loss timing patterns, retaining the shape of Curve 1 and 2 in Figure 8a. The front-loaded pattern, Curve 3 (derived from Curve 1) will be seasoned by the weighted average age of the pool. The back-loaded pattern, Curve 4 (derived from Curve 2), assumes all future losses starts at month 1 after transaction issuance. Figure 8b above illustrates an example of the two loss timing patterns for a transaction that is 30 months seasoned.

These curves can be further back-loaded if warranted. For example, a seasoned transaction with an exceedingly high delinquency pipeline and low corresponding cumulative losses may suggest difficulties in disposing the properties, due to servicers' ineffective liquidation technique or the properties' distressed locations.

5. NAS bonds receive principal according to a schedule and are typically locked out of principal distribution for three years following issuance. However, once all the subordinate bonds are written off, they will receive their principal distribution on a pro rata basis with other senior classes.

Transactions without P&I Advances

In transactions where the servicers do not advance cash for delinquent mortgages, any principal and interest payments will be shut off as soon as a loan becomes delinquent. Any recoveries or liquidation proceeds from that loan will not be available for an extended period of time. In our analysis, DBRS approximates delinquency timing curves by front-loading our standard loss timing curves, as described in the previous paragraph, by an average liquidation timeline, currently at about 24 months. The length of this period is dependent on the liquidation timeline for the mortgage pool and may vary by transaction with different state concentrations.

INTEREST RATE MISMATCH

Interest rate mismatch risk occurs when the interest rate on the underlying mortgage collateral adjusts differently from the interest coupon on the bonds. For example, assume that the underlying mortgage loans are either fixed-rate or hybrid ARMs, and the bonds are based on one-month LIBOR, if LIBOR rises, excess spread decreases. Interest rate mismatch also exists for securitizations in which the mortgage loans and bonds adjust based on different indices. If the two indices were to converge, excess spread would decrease. It is important to quantify the effect of this mismatch by stressing interest rates.

Mismatch can also occur when there are hedging instruments such as interest rate swaps in the transaction. Typically the issuer agrees to pay the swap counterparty a specified fixed rate while receiving one-month LIBOR from the counterparty. To the extent LIBOR is greater than the specified fixed rate, the issuer (or the RMBS trust) benefits as they receive more than they pay. The trust loses money if the opposite happens. It is important to perform various interest rate stresses because the hedges can become unbalanced between outstanding assets and liabilities overtime.

DBRS generally applies two sets of interest rate stresses (upward and downward) for each transaction. Please refer to the Unified Interest Rate Model for U.S. RMBS Transactions for more detail of the interest rate stresses applied by DBRS.

LIQUIDATING TRUST SECURITIZATIONS

Liquidating trust securitizations are primarily backed by liquidation proceeds of non-performing assets. DBRS uses RMBS Insight to assess the probability of default, loss severity and expected losses on the mortgage pool, as described in previous sections. Cash flow analysis for these securitizations is unique due to the nature of the mostly delinquent asset pools.

The expected cash flow in a liquidating trust securitization can come from two main sources: liquidation proceeds of the delinquent assets or regenerated payments if the assets are re-performing due to modification or a credit cure. DBRS generally assumes that the assets will go through the natural course of foreclosure and liquidation, unless there is strong evidence of the servicer's ability to revitalize the delinquent mortgages.

DBRS formulates conservative assumptions for the expected timing of liquidation proceeds for each delinquency bucket. By and large, the REO properties, particularly those already in contract or have been listed, will be the first in line to be liquidated, followed by foreclosure, bankruptcy and 90+-day delinquencies, and finally 60- and 30-day delinquencies. Table 10 gives a base liquidation timeline for each delinquency bucket. These timelines can adjust based on the judicial and non-judicial state composition and servicer-specific liquidating timelines.

Table 10. DBRS Base Liquidation Timeline

Delinquency Status	Liquidation Starts	Duration*
REO in Contract	Month 3	~ 1 Year
REO Listed	Month 5	~ 1 Year
REO Not Listed	Month 7	~ 1.5 Years
Foreclosure	Months 13-19	~ 2 Years
Bankruptcy	Months 13-19	~ 2 Years
90+ DQ	Months 19-22	~ 2 Years
30 & 60 DQ	Months 22-25	~ 2 Years
Sub-performing Loans	24-30 months after becoming delinquent	

** To caputre "tail" risk, DBRS assumes only 90% of the loans in each delinquent bucket would follow the base timeline listed here. The other 10% will linger on for an additional year.*

There is always "tail" risk in non-performing pools, that is, for various reasons, some properties will not be liquidated within a realistic timeframe. DBRS assumes that only 90% of the loans within each delinquent bucket would follow the base timeline, the other 10% of the loans will linger on for an additional year.

Reserves for Interest and Fees

Non-performing loans take time to migrate through the foreclosure pipeline to ultimate liquidation, meanwhile, interest payments and servicing and trustee fees are due from day one. Therefore, reserves are often needed to ensure timely interest payments and transaction fees before the expected liquidation proceeds begin. Aged REO properties or cash flowing mortgage assets (see "Sub-performing Loans" below) may help reduce the reserve amounts to the extent they can cover interest and fee shortfalls early on in a transaction.

In addition, in a liquidating trust securitization, a portion of the principal cash (liquidation proceeds), which otherwise would have been used to amortize the bond balance, is almost always "borrowed" first to cover interest payments and fees, thus prolonging the pay-down of the rated bonds. Under such scenarios, an increased amount of credit support will be needed to account for the "borrowed" principal, resulting in higher credit enhancements than what the expected losses are for the pool, at each rating category.

Sub-performing Loans in Liquidating Trust Pools

DBRS has noticed that some liquidating trust pools may include a portion of sub-performing (or cash flowing) loans. The benefits of including such loans are obvious. They serve to reduce expected losses and more importantly, to fill the interest gap and sometimes lower the amount of reserves.

Sub-performing loans are not contractually current. Sometimes these loans are "performing" because they have been modified or they are merely cash flowing (i.e. making reduced or delayed monthly payments). Default patterns for such loans can be very different from those of contractually current mortgages.

When analyzing the sub-performing loans, DBRS has made the assumption that a significant portion of these loans, if not all, would become delinquent shortly after closing, sometimes as soon as within one year since issuance. The actual timeline to default will depend largely on whether a sub-performing loan has been modified, how long ago the modification took place and what type of modification. Upon a sub-performing loan becoming delinquent, its liquidation proceeds will not begin until 24 to 30 months from that date.

SWAP TERMINATION PAYMENTS

Interest rate swaps were commonly used in RMBS transactions to protect the capital structure against rises in interest rates. Typically, the trust pays a fixed rate payment to the swap counterparty in exchange for a floating rate (LIBOR) payment by the counterparty to the trust. Currently LIBOR rates have fallen to nearly zero, if these swap contracts were to terminate today due to a trust failure to pay, the swap counterparty will be entitled to a termination payment from the trust.

When rating swap termination payments, DBRS is assessing the ability of the trust making the swap termination payments to the counterparty by the legal final maturity date of the transaction.

In most RMBS transactions, the swap termination payments owed to the counterparty are senior in the payment priority to the certificate holders if the trust is the defaulting party. In addition, the size of the available collateral cash flow from each distribution date (and from future distribution dates if the termination payment is not paid in full in a given period) often significantly exceeds what is needed to pay off the termination payments. Therefore, these termination payments have long been regarded as secure cash flow, certainly as good as, if not better than, interest owed to the senior certificates. Due to the considerable deterioration in RMBS performance, some transactions may not be able to fully pay off the swap termination payments, especially in stressed rating scenarios.
When rating swap termination payments, DBRS uses RMBS Insight to assess the probability of default, loss severity and expected losses on the underlying pool, as described in previous sections. An enhanced cash flow analysis is then performed to assess the risk that the collateral may exhaust, due to fast prepayments and/or loss occurrence, before the interest rate swaps expire.

The DBRS cash flow analysis for rating swap termination payments includes running multiple fast and slow voluntary prepayment speeds and passing through expected losses in a front-loaded pattern under various rating scenarios, as described earlier in the section. Once the cash flow is run, the stressed collateral cash flow is compared against each period's potential swap termination payment to determine if there is sufficient coverage to make the termination payment by the legal final maturity of the trust.

To calculate the swap termination payments, DBRS first derives the net swap cash flow for each period by comparing a) the fixed stream of payments from the trust to the swap counterparty against b) the LIBOR payments which the counterparty would expect to pay to the trust. Next DBRS aggregates the net swap cash flow for all future periods to derive the total potential swap termination payments.

In certain underlying documents, there is a penalty rate assessed for any unpaid swap termination payments in each period. DBRS uses the unified interest rate model to stress such penalty rate.

A rating is only assigned when under such rating scenario, there is sufficient coverage of collateral to ultimately pay the swap termination payment should the trust default on swap payment obligation on any distribution date.

For transactions with high loss expectations and/or a swap expiration longer than 12 months, the swap termination payments may not achieve the highest ratings. Additionally, DBRS does not assign ratings below "A" in any swap termination payments, due to the sensitivities to performance volatility at the lower rating categories.

Legal Structure Review

LEGAL STRUCTURE REVIEW

DBRS reviews each transaction and the related documentation to determine if the DBRS legal criteria are satisfied. Counsel for the issuer must provide opinions opining on the likelihood of certain legal outcomes.

BANKRUPTCY REMOTENESS

The primary aim of securitization is the legal separation of a pool of assets (and their associated cash flows and contractual rights) from an asset seller or originator. This separation is achieved by transferring assets from the sellers to an entity that is created specifically for this purpose, a special-purpose entity (SPE). The SPE is designed to be independent of the liabilities and risks associated with the sellers and can therefore issue securities backed purely by the cash flows and credit strength of the assets sold to the SPE.

The separation of the assets from the financial risk of the originators is fundamental to a structured finance transaction. The assets must be transferred in a manner such that, in the event of the bankruptcy of the seller, the assets would not be part of its bankruptcy estate or subject to an automatic stay under Title 11 of the U.S. Code (the Bankruptcy Code). The primary goal is to ensure that the assets are beyond the reach of a seller's creditors. Bankruptcy remoteness is an essential concept in structured finance. Attaining bankruptcy-remote status is dependent on the legal structure of the transaction, the transaction documentation, the relationship between a seller and the SPE and the relevant laws of the applicable jurisdiction(s).

OTHER CONSIDERATIONS

While bankruptcy remoteness is one essential factor in the DBRS legal criteria, it is not the only consideration. The DBRS legal criteria seek to ensure that the structure of a transaction protects holders of RMBS and sufficient resources are always available to allow the SPE to meet its obligations of the rated securities. DBRS's legal review addresses various other issues that may arise during the life of the transaction, such as the proper servicing of the assets and collection of the cash flows they generate. The legal structure is also reviewed to confirm that insolvency, legal status or existence of claims against any entity involved in the transaction do not threaten cash flow to rated security holders.

For details on the legal structure review, please refer to the DBRS methodology "Legal Criteria for U.S. Structured Finance Transactions".

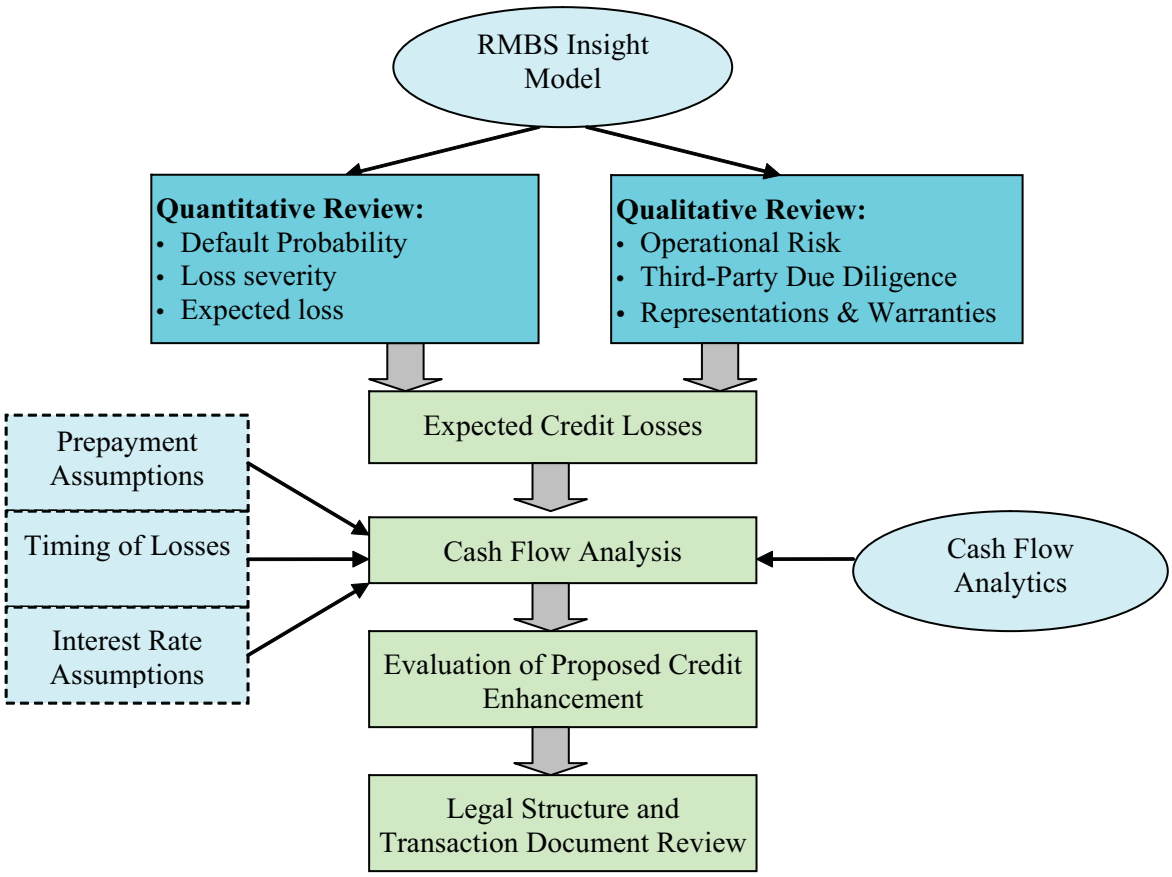
Appendix 1. Rating Process for U.S. RMBS Transactions

RATING PROCESS

The DBRS methodology for rating U.S. residential mortgage-backed securities (RMBS) reflects the following analytical considerations:

- Quantitative review: Loan-level default probability and loss severity analysis.
- Qualitative review:
  - Operational risk assessment.
  - Third-party due diligence review.
  - Representations and warranties review.
- Cash flow analysis (for transactions that may be impacted by cash flow stresses)[6].
- Evaluation of the form and sufficiency of proposed credit enhancement for the respective ratings.
- Legal structure and transaction documents review.

The following diagram describes the process for analyzing a mortgage transaction:



1. DBRS conducts a loan-level analysis using the DBRS proprietary U.S. RMBS model, RMBS Insight[7]. The model analyzes default probability, loss severity and expected credit losses of a mortgage pool.

6. Certain transactions may not be affected by cash flow stresses. These structures are typically sequential-pay, without triggers and the principal and interest waterfalls are kept strictly separate.
7. The RMBS Insight Model is a substantial component of the DBRS rating process. A material deviation from the rating implied by the model would be a three-notch or greater rating difference.

2. RMBS Insight also incorporates the results from the following qualitative reviews:
   - DBRS assesses the operational risk by evaluating the quality of the mortgage originator and servicer.
   - DBRS reviews third-party due diligence results to assess the accuracy of the data provided by the issuer and whether the mortgage loans were originated in compliance with applicable underwriting standards and legislations.
   - DBRS reviews the proposed representations and warranties for the transaction and the related counterparty strength.

3. For transactions that may be impacted by cash flow stresses, DBRS performs a cash flow analysis by incorporating stress assumptions on prepayments, timing of losses and interest rates to ensure timely payments of interest and principal distributions to the holders of the rated bonds.

4. DBRS evaluates the form and sufficiency of proposed credit enhancement for the respective ratings.

5. DBRS reviews the legal structure of the transaction and the associated legal opinions.

Appendix 2. Operational Risk Assessment

ORIGINATOR REVIEW

The originator review process is done to assess whether the loans have been originated in accordance with the seller's underwriting guidelines and that the originator is in compliance with applicable laws and regulations. For multi-originator transactions, the review is typically done on originators that encompass 15% or more of a transaction, however, this threshold may be lowered if a transaction contains a product that is deemed to be high risk or if the originator has had a history of poor performance. The assessment includes a review of the items noted below and is supplemented by the results of a third-party due diligence review performed for the transaction. (For details on due diligence reviews, please refer to the DBRS methodology "Third-Party Due Diligence Criteria for U.S. RMBS Transactions"). For seasoned transactions, an originator review is generally not conducted as DBRS believes that the performance history of the loans is more indicative of the credit risk than the dated origination and underwriting practices. Moreover, many of the originators active from the pre-crisis era may have long exited the business. Those who continue to originate may have significantly changed their practices and controls over time.

DBRS begins the initial originator review process by scheduling a date to conduct an on-site visit of the company. Once a date is confirmed, DBRS sends a sample agenda that outlines the topics to be covered during the meeting which includes items such as organizational charts, financial statements, underwriting guidelines and performance statistics. During the on-site review, DBRS meets with senior management to discuss the origination operations, tour the facilities and review system demonstrations, as appropriate. DBRS assesses the information gathered through the review process, along with its surveillance data and industry statistics to determine if an originator is acceptable. In instances where DBRS determines that the originator is below average, issuers may incorporate certain structural enhancements into a proposed transaction such as additional credit support or a third party firm to provide the requisite representations and warranties (reps and warrants) in order for DBRS to be able to rate the transaction. In the event that DBRS determines that an originator is unacceptable, it may decline to rate the deal.

The originator review process typically involves a review and analysis of the following:

1. Company and Management
2. Financial Condition
3. Controls and Compliance
4. Origination and Sourcing
5. Underwriting Guidelines
6. Valuation Practices
7. Technology

Company and Management

DBRS believes that no origination operation can be successful without a strong seasoned management team that possesses demonstrated expertise in the product(s) they are originating. As a result, DBRS views favorably those originators whose management team possesses greater than ten years of industry experience. Additionally, DBRS believes the participation of the credit risk management, quality control, legal and compliance departments in all aspects of the origination and underwriting process is important in order to identify and mitigate risk. Furthermore, adequate capacity and resources to handle fluctuations in loan volume are of paramount importance.

Financial Condition

DBRS reviews the originator's financial condition to determine whether the lender has sufficient resources to make the appropriate representations and warranties on the loans being included in a securitization.

In cases where DBRS does not maintain a public rating of the originator, the DBRS Financial Institutions Group provides an internal assessment (IA) of the relevant institution. In certain cases, DBRS may rely on public ratings assigned and monitored by other credit rating agencies.

For entities with credit rating below "BBB", DBRS believes that a comprehensive and satisfactory due diligence performed for securitizations should reduce the occurrence of future repurchase claims due to breaches of representations and warranties. In such instances, DBRS places a greater reliance on due diligence to compensate for the weaker financial strength of the origination entity.

Some items that are reviewed as part of this process may include:

- Company ownership structure
- Management experience
- Corporate rating of any parent company (if applicable)
- Internal and external audit results
- Revenue sources and lines of credit
- Costs to originate
- Litigation (past, present and expected)
- Existing business strategy and strategic initiatives
- Recent or planned mergers or acquisitions
- Recent or planned transfers or acquisitions
- Securitization history and future plans

Any financial stress identified can elicit originator problems either immediately, as in the case of a bankruptcy, or lead to a slow degradation of the performance of the collateral. Therefore, the originator's financial condition weighs on all aspects of DBRS analysis of RMBS transactions including the evaluation of proposed credit enhancement levels and the presence of proposed structural safeguards.

Controls and Compliance

DBRS believes internal assessments and quality-control reviews are critical in recognizing procedural errors that may not be easily detectable. These reviews can be used to identify trends, training opportunities and exception practices. Frequent checks can assist management in quickly instituting changes to areas needing improvement, as well as benchmarking those results to performance. In addition to the aforementioned reviews, a monitoring process should be in place to ensure that the originator is in compliance with all applicable laws, rules and regulations and that all employees in customer-facing positions are appropriately trained.

DBRS views favorably those originators that are in good standing with FNMA, FHLMC, FHA, VA and GNMA and are not the subject of any regulatory or state investigation(s). Minimal or no repurchases due to breaches of representations and warrants are considered of paramount importance as well as robust procedures for vendor selection and oversight. Additionally, strong controls for managing potential conflicts of interest associated with parties to a transaction are also important.

Origination and Sourcing

DBRS reviews the origination and sourcing channels to determine if the originator has a clearly defined strategy. Approval and monitoring processes for third party originators including brokers, correspondents and conduits are also reviewed to determine if the originator has strong procedures and controls. Underwriting practices that include regular performance tracking and post closing quality control reviews are viewed favorably by DBRS. Furthermore, procedures that ensure new loan setup accuracy and data integrity are fundamental to ensuring minimal errors. As a result, DBRS views favorably those originators with a high level of automation and a low tolerance for missing documentation. Additionally, DBRS reviews the originator's efforts towards compliance with regulatory guidelines and industry best practices. Furthermore, the originator's portfolio is reviewed for changes in size, product type or delinquency (such as first payment defaults).

Underwriting Guidelines

An originator's appetite for risk and the underlying quality of its underwriting guidelines can have a significant impact on deal performance. Therefore, DBRS uses both a qualitative and quantitative approach to conduct its originator reviews and make comparisons among originators. Historical loan performance, repurchase volume and mortgage insurance claim denial rates are just some of the components that are incorporated into determining the quality of an originator.

DBRS views favorably those originators that have robust guidelines and use reliable means to accurately assess a borrower's income, employment and assets. Furthermore, sophisticated technology and strong fraud-detection procedures can help prevent early payment defaults as well as accurately determine debt-to-income ratios. An originator's use of exception and override practices can also help to access the quality of the originations. Additionally, separation of the origination and underwriting functions in addition to a compensation structure that emphasizes quality over loan volume can help to ensure predicable performance.

Valuation Practices

The accuracy of appraisals can severely reduce losses to RMBS investors. As a result, DBRS considers a comprehensive property evaluation process a necessity. Employing licensed appraisers that have no interest in the property and receive no benefit from or compensation for the mortgage loan's approval or disapproval are viewed favorably by DBRS. Since many firms outsource this function, comprehensive appraiser approval and monitoring processes as well as employing an appraisal review function into the origination process is also considered essential. An originator's use of real estate brokers providing broker price opinions and automated valuation models (AVMs) is also evaluated to determine the criteria and frequency by which they are used. DBRS views favorably those firms that use these items to monitor the accuracy of their appraisal process.

Technology

Technology resources are an integral component of the originator review process. While DBRS does not subscribe to specific systems architecture, adequate systems controls, consumer privacy protection and backup procedures, including disaster recovery and business continuity plans, are considered critical processes and should be in place. Furthermore, originators must ensure that any offshore vendors are monitored and a backup plan is in place to ensure minimal downtime. Over the past few years, leveraging the Internet has enabled many firms to operate effectively in the mortgage business. Originators have used the Internet for marketing, customer service and the dissemination of pertinent information, such as applications and appraisal requests. As a result, DBRS expects originators to have the appropriate staff and controls in place to ensure website availability, account maintenance and enhancements. Sophisticated technology, with robust functionality, is viewed favorably by DBRS as it often helps bring large efficiencies to the origination operations in addition to more predictability in terms of loan performance.

SERVICER REVIEW

The servicer review process evaluates the quality of the parties that service or conduct backup servicing on the loans being securitized. DBRS meets with senior management at the servicing entity to discuss the servicing operations, tour the facilities and review system demonstrations, as appropriate. DBRS assesses the information gathered through the review process, along with its surveillance data and industry statistics to determine if a servicer is acceptable. In instances where DBRS determines that the servicer is below average, issuers may incorporate certain structural enhancements into a proposed transaction such as additional credit support, dynamic triggers or the presence of a warm or hot backup servicer in order for DBRS to be able to rate the transaction.

The servicer review process typically involves an analysis of the following:

1. Company and Management.
2. Financial Condition.
3. Loan Administration.
4. Customer Service.
5. Escrow.
6. Default Management.
    - Collections
    - Loss Mitigation
    - Bankruptcy
    - Foreclosure
    - Real Estate Owned (REO)
    - Advancing
7. Investor Reporting.
8. Technology.

For non-performing transactions, the process focuses on the company's strategy for handling various types of delinquent loans and its success rate in getting those loans to re-perform through foreclosure or sold through the REO process as quickly as possible.

For details on the servicing review process, please refer to the DBRS methodology "Operational Risk Assessment for U.S. RMBS Servicers".

OPERATIONAL RISK FRAMEWORK

In order to evaluate operational risk consistently across all newly originated RMBS pools[8], DBRS developed a framework that incorporates operational measures into the RMBS Insight model. The framework takes into consideration key aspects of our originator and servicer assessment, the results of the third-party due diligence review and the strength of the representations and warranties provider.

By stratifying historical performance by originator and servicer, DBRS was able to determine the variances across the RMBS performance spectrum (from the best- to the worst-performing transactions). Loans that are securitized near origination and that have sufficient information to be scored are identified. To qualify for the analysis, an originator must place a significant number of loans with at least three servicers who also service a significant number of loans from at least three originators. A loan-level logistic regression model is fit that has three explanatory variables: (1) the log odds of the 2-year D180 score; (2) a factor variable for originator; (3) a factor variable for servicer. The dependent variable for the analysis is a binary indicator of whether the loan became 180 days delinquent in the first two years after origination. Having fit the model, the range of the effect of originator (servicer) is calculated from the parameters associated with originators (servicers). In this way, the marginal or additional effect of origination (servicing) is captured after adjusting for the known loan characteristics and the servicer (originator).

Based on above analysis, the performance variance by originator and servicer generally fall between the +/- 25-35% range for originators and servicers (excluding a small number of irregular deals). For the purpose of this framework, DBRS limits the effect (i.e. benefits or penalties) to +/- 20%.

8. This framework is generally applicable to newly-originated loans. For seasoned loans, operational risk has usually manifested in deal performance over time, and is therefore captured through the seasoned characteristics by RMBS Insight.

DBRS reviews the following categories for originators[9]. Each category carries a different weight and sum to 100%:

1. Company and Management[10]
2. Controls and Compliance
3. Origination and Sourcing
4. Underwriting Guidelines
5. Valuation Practices
6. Technology
7. Quality of Information Provided to DBRS
8. Exception Rate from Third-Party Due Diligence
9. Historical performance of similar products

DBRS also reviews the following categories for servicers. Each category carries a different weight and sum to 100%:

1. Company and Management
2. Controls and Compliance
3. Loan Administration
4. Customer Service
5. Escrow
6. Collections
7. Loss Mitigation
8. Bankruptcy
9. Foreclosure
10. Real Estate Owned (REO)
11. Advancing
12. Investor Reporting
13. Technology
14. Quality of Information Provided to DBRS

DBRS constructed detailed proprietary scorecards that measure the quality of each of the above categories. They are evaluated and assigned a grade of above average, average and below average. Within the scorecards, certain scoring factors are deemed more important than others by DBRS, therefore they are further ranked high, medium and low importance. Accordingly, the originator and servicer is each scored separately, and adds up to a maximum score of 100 each.

Based on the originator and/or servicer score, benefits or penalties may be applied to loss expectations for a pool, through the adjustment of delinquency score. An originator (or servicer) score of 50 represents average quality and generally warrants neither a benefit nor a penalty. Any adjustment, up or down, is bounded by +/-20%, as derived above in the performance variance[11]. Any benefits to loss expectation need to be supported not only by a high originator or servicer score, but also by strong performance histories of similar products by the same originator or servicer.

Irrespective of the scores, DBRS may choose not to rate a transaction should there be overriding concerns with any originator or servicer.

9. For these categories, DBRS included related aspects from third-party due diligence and representations and warranties reviews that support the originator assessment.
10. This category includes the financial condition of the originator, who is typically also the provider of representations and warranties.
11. DBRS limits the benefit at 25% should the originator and servicer's combined credits exceed 25%.

Appendix 3. Peak-to-Trough Home Price Forecast Model

RMBS Insight includes a base home price forecast. The forecast is at the series level of the Case-Shiller index. The forecast is the output of a model built to estimate the peak-to-trough level of house price declines. The approach taken in building the model is to commonalities between past incidents during which prices have fallen substantially.

DATA

The modeling data set consists of 20 series from the Case-Shiller data which exhibited a steep fall in house prices after a two-year increase, with the peak occurring prior to the year 2000. The 20 geographies are mostly located in California, Texas and the Northeast. The peaks occur in the early 1980's to the early 1990's. Table 11 gives the 20 geographies used and summary data.

Table 11. The 20 Geographies

Series	MSA	County	State	Peak Month	% Increase Prior 2 Years	% Total Decline
1 CAC037Q	Los Angeles-Long Beach-Glendale, CA	Los Angeles	CA	199005	32	-29
2 CAC045S	N/A	Mendocino	CA	199005	31	-18
3 CAC047S	Merced, CA	Merced	CA	199011	35	-16
4 CAC065Q	Riverside-San Bernardino-Ontario, CA	Riverside	CA	199005	30	-30
5 CAC067Q	Sacramento--Arden-Arcade--Roseville, CA	Sacramento	CA	199008	46	-25
6 CAC071Q	Riverside-San Bernardino-Ontario, CA	San Bernardino	CA	199008	30	-27
7 CAC077Q	Stockton, CA	San Joaquin	CA	199008	30	-20
8 CAC099Q	Modesto, CA	Stanislaus	CA	199005	41	-20
9 CAC113S	Sacramento--Arden-Arcade--Roseville, CA	Yolo	CA	199011	48	-16
10 CTC003S	Hartford-West Hartford-East Hartford, CT	Hartford	CT	198808	38	-22
11 CTC005S	N/A	Litchfield	CT	198902	16	-19
12 CTC009S	New Haven-Milford, CT	New Haven	CT	198811	25	-18
13 CTC011S	Norwich-New London, CT	New London	CT	198905	22	-18
14 CTC013S	Hartford-West Hartford-East Hartford, CT	Tolland	CT	198811	39	-21
15 MAC013Q	Springfield, MA	Hampden	MA	198908	16	-24
16 MEC001O	Lewiston-Auburn, ME	Androscoggin	ME	198911	27	-14
17 NJC029Q	Edison-New Brunswick, NJ	Ocean	NJ	198805	44	-22
18 OKC109Q	Oklahoma City, OK	Oklahoma	OK	198308	17	-30
19 TXC135O	Odessa, TX	Ector	TX	198302	21	-37
20 TXC329O	Midland, TX	Midland	TX	198205	32	-36

APPROACH

The approach is to look for consistencies in the behavior of house prices after the peak. To facilitate the search, the variables are expressed in terms that are comparable across situations. The following variables are defined:

- The proportion of the total decline yet to be experienced. This metric allows comparisons between markets, yet the total price decline can easily be calculated from it since the decline-to-date is known. This variable is monthly.
- The ratio of price decline to date to the increase in the two years prior to the peak.
- The number of months since the peak.

MODEL

The dependent variable of the model is the proportion of the total decline yet to be experienced. The other two variables are the explanatory variables. The effects are introduced in a nonlinear way via linear splines.

The model is fit by averaging the coefficients across 5000 bootstrap samples. Each sample selects a single observation from each of the 20 geographies. A bootstrapping approach was selected to avoid the dependency of errors within a geography.

Within the Case-Shiller universe, there are 302 series (single family, total index) that have experienced a peak prior to 2010 and whose increase in prices in the two years prior to the peak was at least 10%. To evaluate the stability of the model, the total peak-to-trough decline is estimated by the model at four time periods. The results are presented in Table 12. As seen, the model projection has been very stable since June, 2008. This suggests that the current declines are following a pattern similar to those seen in the past.

Table 12. Model Stability

Forecast Date	Projected Peak-to-Trough Decline (%)
12/2010	34.3
6/2009	38.0
6/2008	37.7
6/2007	21.1

MODEL STRESSES

The distribution of the geographic average of future decline can be estimated from the model. The values across geographies are certainly correlated. The average correlation of the percent change in house price across the geographies is 50%. That value is used when calculating the standard error of the mean. The ability to estimate percentiles of the house price distribution is an important component of the ratings categories methodology.

Appendix 4. Model Validation

SUMMARY

Upon the completion of RMBS Insight, DBRS conducted validations of the model results by comparing them against actual historical performance. The validation is done for both probability of default and loss severity.

PROBABILITY OF DEFAULT VALIDATION

Referring to Figure 1 in the "Modeling Methodology" section, a validation of the default model is tantamount to validating the probability that the loan ever becomes 180 days delinquent. The remainder of the calculation to arrive at default – the roll from 180 days delinquent to default – is a user input.

The process of producing the validation is as follows:

1. A random sample of 5,000 loans is taken from each of the target populations.
2. The actual proportion of loans ever to become 180 days delinquent, charged off or REO is calculated.
3. The actual CPR experience of the pool is calculated.

RMBS Insight is run using the actual CPRs and without shrinkage. The latter is not applicable as the loans are not from a single deal. Setting the "D180->Default" roll rate to 1 results in a default estimate that is the same as the loan ever becoming 180 days delinquent. Note that RMBS Insight will automatically index the house prices from origination using Case-Shiller data. The model 180 day delinquency rate is the lifetime total balances expected to become 180 days delinquent as a percentage of the starting pool balance.

To demonstrate RMBS Insight's ability to operate in disparate economic climates, Table 13 shows the results for the 2003 and 2007 vintages. Each row represents the forecast and actual performance of 5,000 loans scored from origination. The actual 180 day delinquency rate is total balances actually becoming 180 days delinquent (or charged off or in REO) to date. The data is as of April 30th, 2011. The "Difference" column gives the estimated remaining percentage of the original pool to become 180 days delinquent. The "Future D180 Rate" is the future expected 180 delinquency rate as a percentage of loans that are under 180 days delinquent in the current pool. Finally, the "DQ 180+" column gives the percentage of the current pool balance that is 180+ days delinquent.

Examining Table 13, one is first struck by the dramatic difference in performance between the two vintages. The forecast for the 2007 vintages is 7 to 19 times higher. Secondly, RMBS Insight tracks the actual performance very well. Note that the 2003 vintage was not entirely immune from the recession and housing bust – events not anticipated by a forecast from 2003. In considering the 2007 vintage, it is important to realize that the final results are not known. However, the vintage is much farther through the process of producing loans that are 180 day delinquency curve than it is the default curve.

Table 13. Cumulative 180 Day Delinquency Rates by Vintage and FICO Range (From Origination)

	Ever 180 Days DQ (% of Original Pool Balance)				
Category	Model	Actual To Date	Difference	Future D180 Rate[1]	DQ 180+[2]
2003 Vintage (all Loans)					
FICO					
FICO <= 625	10.2%	12.7%	-2.5%	--	15.8%
FICO: 626-679	5.3%	7.6%	-2.3%	--	11.4%
FICO: 680-719	2.8%	2.5%	0.3%	2.7%	5.3%
FICO: >=720	1.6%	1.4%	0.2%	1.8%	3.6%
2007 Vintage (all Loans)					
FICO					
FICO <= 625	70.5%	58.0%	12.6%	35.1%	39.8%
FICO: 626-679	65.2%	56.0%	9.2%	26.0%	39.0%
FICO: 680-719	50.3%	45.6%	4.7%	11.7%	30.8%
FICO: >=720	29.9%	25.3%	4.6%	10.9%	18.6%

[1] *Future 180 day DQs as a % of loans that are under 180 days DQ, as of 4/30/2011.*

[2] *Percent of the current pool balance that is 180+ days DQ.*

LOSS SEVERITY VALIDATION

The validation of the recovery model is conducted in a similar manner. The recovery model is run on samples of loans that have been liquidated. For each loan, the origination appraisal is updated to the liquidation date using the Case-Shiller home price index. The recovery model is applied and loss is calculated. The average severity for each group is calculated as total loss divided by total balance at charge-off. Each group in the tables is a random sample of 5,000 liquidations taken from each of the target populations.

Table 14 gives the results for loans liquidated in two years: 2007 and 2010. The results are segmented by FICO range. The average loan age at the time of liquidation is also given. Noticeable is the large increase in severity and average loan age between the two periods. There is also a notable relationship between the FICO ranges and average severity.

Table 14. Severity by Liquidation Date and FICO Range

	Severity		
Category	**Model**	**Actual**	**Loan Age**
2007 Liquidation			
FICO			
FICO <= 625	38.7%	37.2%	32
FICO: 626-679	33.0%	30.8%	29
FICO: 680-719	27.2%	26.3%	28
FICO: >=720	19.2%	23.1%	28
2010 Liquidation			
FICO			
FICO <= 625	68.5%	69.6%	49
FICO: 626-679	63.7%	63.0%	48
FICO: 680-719	59.5%	56.9%	47
FICO: >=720	56.1%	53.5%	46

Appendix 5. Rating Category Models

MODELS

The models used to drive the ratings categories are:

1. Peak-to-trough model of house prices (to address the identifiable risk).
2. D180 correlation model (to address the unidentifiable risk).
3. Recoveries correlation model.

The D180 correlation model is discussed first, then the recoveries correlation model and finally the algorithm for arriving at ratings categories.

The D180 correlation is estimated through an analysis of the same data that produced Figure 7a in the "Shrinkage" section. To the extent that the variation in Figure 7a exceeds that which can be attributed to Causes 1 and 2, it is ascribed to correlation between the loans.

The 'basic' correlation model is specified as follows. Let

$$X_j = \begin{cases} 1 \text{ if } j^{th} \text{ loan is 180 days delinquent within 2 years.} \\ 0 \text{ otherwise} \end{cases}$$

and

$$P[X_j = 1] = p_j$$

for $j=1,\ldots,n$.

Now define

$$X_j = I(T_j <= F^{-1}(p_j)),$$

where,

$T_j = aZ_j + bZ$

$a^2 + b^2 = 1$,

Z_j, Z are iid N(0,1)

$I(\ )$ is 1 if the quantity in the parentheses is 1 and 0 otherwise.

F^{-1} is the inverse function of the standard normal distribution.

We see that X_j satisfies the two conditions at top and note that

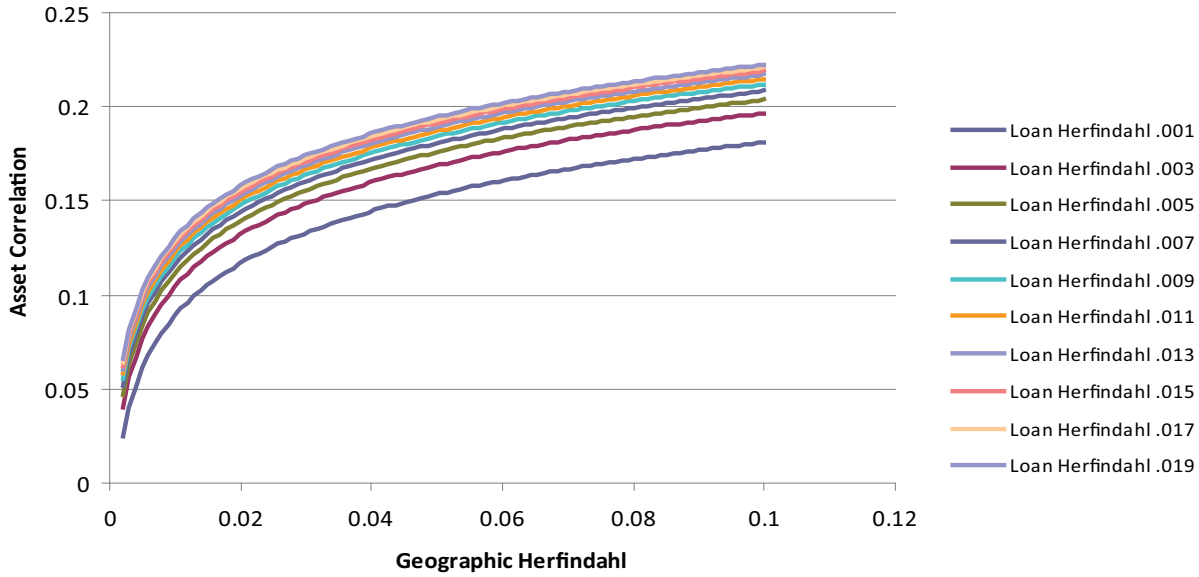
T_j is N(0,1)

$Cor(T_j, T_k) = b^2$

Z can be referred to as the latent variable – its value is unobserved but can be inferred given a value for b. A (normalized) Herfindahl index based on geography (MSA level) and loan size is calculated for each of the deals. A parametric model which is a function of the two concentration measures and credit quality is fit using the specification above. The data for the model fit are the expected and actual outcomes for 2891 deals. The expectation is the output of the delinquency score. The parameters determine the asset correlation for each deal which in turn specifies the value of b for the deal. Given b for deal j permits the estimation of Z for that deal. The parameter values are chosen so the Z's satisfy the model assumptions for them.

Figure 9 shows the correlation between X_i and X_j as a function of the Herfindahl indices implied by the data. As can be seen, the data supports the premise that correlation (and hence risk) increases with concentrations.

Figure 9. Asset Correlation by Concentration



In interpreting the estimated D180 correlations, there are two important factors to consider:

1. Any correlation has a large effect.

   Moving from a model of no correlation to a model of correlation has a large impact on the statistical properties of the portfolio default distribution. In particular,

   - The mean is no longer a consistent estimator and the portfolio variance does not collapse toward zero.
   - The Central Limit Theorem no longer applies. There is a limiting distribution. It is not normal.

2. The correlation is conditional on the future value of house prices.

   - One would find a much larger correlation if one estimated the correlation from score values in which the future house prices vary from the actual. The effect of that exercise would be to move house price risk from being an identifiable risk to an unidentifiable risk.

The recoveries correlation model is similar in spirit to the D180 model. Specifying the recovery rate distribution is really specifying the distribution of the residuals from the recovery rate model. A correlation-based model is used. The model specification is as follows:

$$e_i = (\text{sqrt}(s)*L + \text{sqrt}(1-s)*L_i)*\text{b}, \quad i=1,..,n$$

where,

$e_i = R_i - \text{E}[R_i]$, is the residual between the recovery on the i^{th} loan and its expected value (model output),

$L, L_1,..,L_n$ are *iid* Logistic (0,1) random variables (0 is the location parameter, 1 is the scale parameter; L has mean 0 and variance $p^2/3$),

b is the scale parameter,

s is the recovery correlation.

The logistic distribution is used because it is seen to be a good fit to the data.

It is important to remember that since $\text{E}[R_i]$ is a function of future house prices, that this distribution is conditional on future house prices.

IMPLEMENTATION OF CORRELATION MODEL

The D180 and recoveries distribution are very complex. There is no closed form solution for either of them. They depend on the complete set of loan-level values. For example, a single large loan in a portfolio can have a material impact on the balance-weighted portfolio-average D180 distribution. Even though neither distribution can be written down, both can be determined via simulation methods. For the D180 distribution, simulating the Z_i's and Z generates a realization of the X_i's. These can then be averaged to produce a realization from the balance-weighted, portfolio-average D180 distribution. Repeating the process permits estimation of any desired percentile of the distribution.

IMPLEMENTATION OF RATING CATEGORIES

The probabilities associated with the rating categories are from the DBRS published idealized default table.

The process for producing the default estimates for each rating is as follows:

1. The MVD scenarios are derived from the peak-to-trough model. Given a probability, p, the $(1-p)^{th}$ quantile of the national average MVD distribution is found. The value of p for each rating category is chosen from the DBRS published idealized default table, matching the tenor to the weighted-average life of the collateral.

2. For each MVD, the balance-weighted, portfolio-average D180 rate and the balance- and default-weighted, portfolio-average recovery rate distributions are found via simulation.

3. The appropriate value of 2-year D180 for each category is found. The value satisfies the requirement that the unconditional probability the D180 rate exceeds it equals the target probability (from the DBRS published idealized default table). The unconditional probability is given by:

   $$P[D>t] = \int P[D>t|h]f(h)dh$$

   Where,

   D is the 2-year D180 rate,

   $P[D>t|h]$ is the probability the 2-year D180 rate exceeds t given the MVD is h (this is the output of the correlation model discussed above),

   $f(h)$ is the pdf of house prices (MVD). This distribution is the output of the peak-to-trough model.

   For computational efficiency, the integral is approximated by dividing the MVDs into buckets

4. Similarly, the unconditional balance and default weighted recovery distribution is given by:

   $$P[R<=t] = \int P[R<=t|h]f(h)dh$$

   Where,

   R is the balance and default weighted portfolio average recovery rate,

   $P[R<=t|h]$ is the probability the recovery rate is less than t given the MVD is h $f(h)$ is the pdf of house prices (MVD). This distribution is the output of the peak-to-trough model.

   For computational efficiency, the integral is approximated by dividing the MVDs into buckets.

5. Once the portfolio-level D180 and average recovery rates are determined for each rating category, they are pushed down to the loan level and the remainder of the model is run.

In pools with high base case expected losses, gap between any two rating categories can be compressed and therefore can be subject to rating volatility. In RMBS Insight, DBRS implements a minimum step-up in losses between any two rating categories for high-loss pools. Specifically, for pools with expected losses exceeding 40%, a minimum step-up in losses of 5% is necessary. The step-up phases in linearly starting with pools with expected losses of 10% (3% minimum) to 40% (5% minimum). For example, a pool with expected loss of 25% will have a minimum step-up of 4.5% in between any two rating categories.

Appendix 6. DBRS Idealized Default Table

	Maturity in Years									
Rating	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
AAA	0.0110%	0.0264%	0.0460%	0.0699%	0.0987%	0.1330%	0.1736%	0.2212%	0.2765%	0.3405%
AA (high)	0.0161%	0.0390%	0.0691%	0.1071%	0.1539%	0.2107%	0.2784%	0.3580%	0.4501%	0.5554%
AA	0.0212%	0.0517%	0.0922%	0.1442%	0.2091%	0.2883%	0.3832%	0.4948%	0.6237%	0.7703%
AA (low)	0.0281%	0.0709%	0.1297%	0.2055%	0.2994%	0.4123%	0.5445%	0.6962%	0.8672%	1.0571%
A (high)	0.0419%	0.1095%	0.2045%	0.3280%	0.4801%	0.6602%	0.8671%	1.0991%	1.3543%	1.6306%
A	0.0487%	0.1287%	0.2419%	0.3893%	0.5704%	0.7841%	1.0283%	1.3005%	1.5978%	1.9173%
A (low)	0.0945%	0.2420%	0.4391%	0.6815%	0.9643%	1.2825%	1.6309%	2.0045%	2.3990%	2.8101%
BBB (high)	0.1860%	0.4685%	0.8333%	1.2659%	1.7521%	2.2792%	2.8359%	3.4126%	4.0013%	4.5956%
BBB	0.2318%	0.5818%	1.0305%	1.5581%	2.1460%	2.7776%	3.4384%	4.1166%	4.8024%	5.4884%
BBB (low)	0.3732%	0.8912%	1.5142%	2.2099%	2.9528%	3.7230%	4.5053%	5.2884%	6.0636%	6.8252%
BB (high)	1.0800%	2.4384%	3.9327%	5.4686%	6.9863%	8.4500%	9.8400%	11.1473%	12.3697%	13.5091%
BB	1.3627%	3.0573%	4.9001%	6.7721%	8.5997%	10.3408%	11.9738%	13.4908%	14.8921%	16.1826%
BB (low)	2.2346%	4.7297%	7.2541%	9.6836%	11.9572%	14.0507%	15.9604%	17.6938%	19.2641%	20.6863%
B (high)	3.6297%	7.4056%	11.0204%	14.3419%	17.3292%	19.9866%	22.3389%	24.4186%	26.2592%	27.8922%
B	4.8503%	9.7471%	14.3160%	18.4179%	22.0296%	25.1805%	27.9201%	30.3028%	32.3799%	34.1974%
B (low)	10.0776%	17.6609%	23.5135%	28.1371%	31.8670%	34.9314%	37.4891%	39.6528%	41.5044%	43.1047%
CCC (high)	18.7898%	30.8505%	38.8426%	44.3357%	48.2625%	51.1831%	53.4376%	55.2363%	56.7119%	57.9502%
CCC	22.2746%	36.1264%	44.9743%	50.8151%	54.8208%	57.6837%	59.8169%	61.4696%	62.7949%	63.8884%
CCC (low)	61.1373%	68.0632%	72.4872%	75.4076%	77.4104%	78.8419%	79.9085%	80.7348%	81.3974%	81.9442%
C	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%

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Insight beyond the rating.

DBRS, Inc.
140 Broadway
35th Floor
New York, NY 10005
TEL +1 212 806 3277

Exhibit D

Lesson: QAS Overview

The following is a high-level account of Fannie Mae's current National Underwriting Center (NUC) Quality Assurance review process. (See Figure 1 for a visual representation.) This process is subject to change at any time in Fannie Mae's discretion.

1.0 NUC Review Process

1. Loans are selected for review by the National Underwriting Center (NUC).
2. Loan files are requested from the lender.
3. The lender provides the loan file to Fannie Mae via paper or a business-to-business data exchange.
4. NUC reviews the loan file for completeness, and requests any missing documents.
5. Supplemental documents are submitted by the Lender as requested by the National Underwriting center.
6. An underwriter reviews the loan file and records any defects both significant and informational.
7. If significant defects are identified the underwriter would recommend that the loan be repurchased by the lender.
8. Upon validation of the significant defect(s) and determination that the loan does not meet Fannie Mae criteria, a request for repurchase is sent to the lender.
9. The lender responds with a Concur or Rebut.

QAS serves as the conduit to streamline this communication process for both NUC and the lender community.

2.0 Underwriting Performance Review Types

The primary types of underwriting reviews performed by Fannie Mae's National Underwriting Center are:

- **PPR**: Post Purchase Reviews
- **EPD**: Early Payment Default
- **LOS:** Loss Mitigation Review
- **PFR:** Post Foreclosure Review
- **RV**: Recourse Violation
- **MBS**: Mortgage Back Securities

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NUC High Level Overview – Review Process

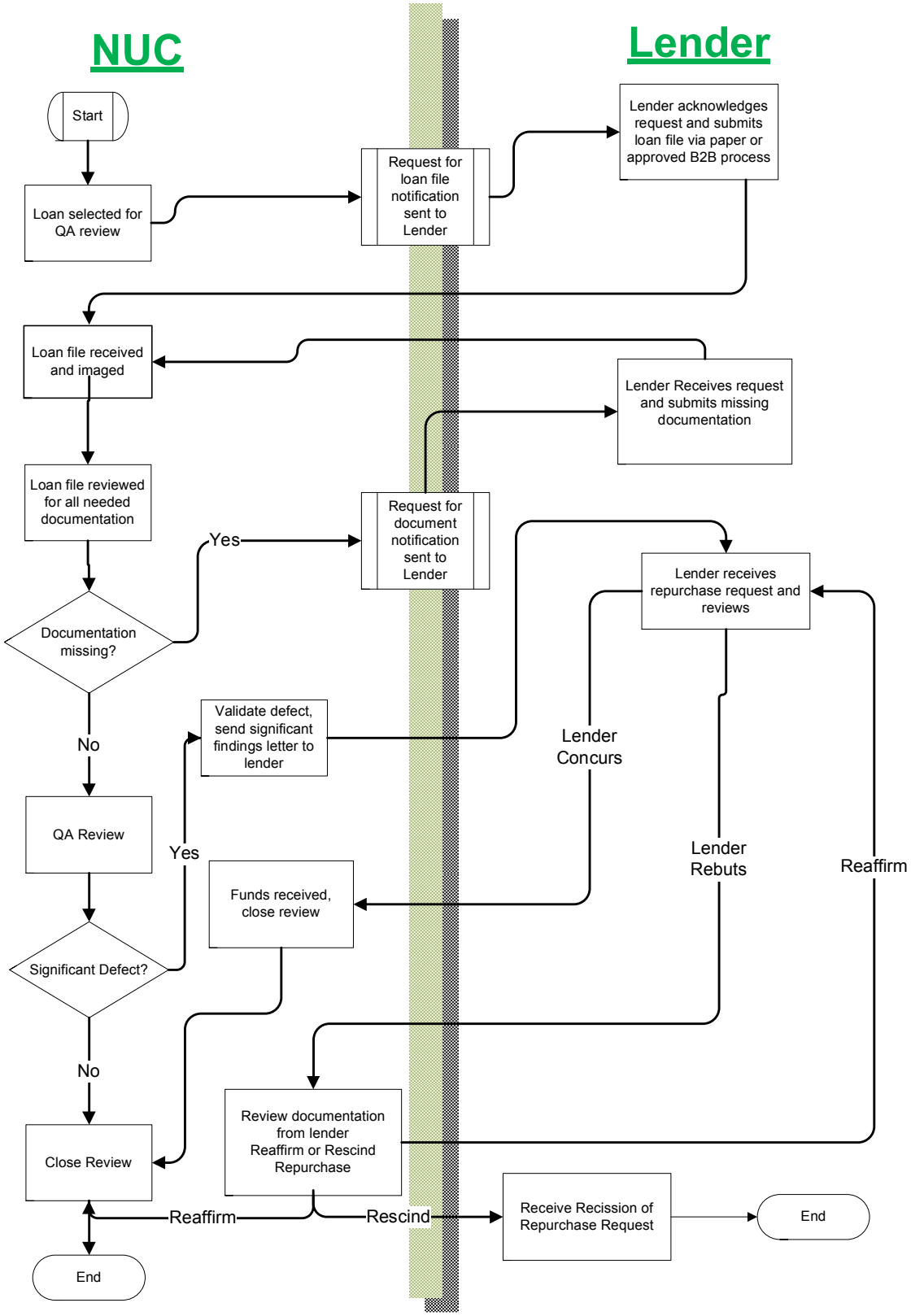

Figure 1: Fannie Mae Review Process – High Level Overview

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Exhibit E

Wells Fargo Funding

Repurchase and Rescission Process Overview

October15, 2010

A New Reality for Repurchase and Rescission Requests

In today's mortgage market, repurchase and rescission requests from investors and mortgage insurance companies (MI companies) have become commonplace. This has been driven by the increase in delinquent borrower accounts, as well as the liquidation of foreclosed properties. These macro-economic changes have prompted increased investigation into potential breaches of representations and warranties.

Wells Fargo is committed – just like you are - to honoring contractual obligations with investors and mortgage insurance (MI) companies*. We want to ensure that the resolution process for Repurchase and Rescissions is as smooth and swift as possible.

Some demands can be rectified simply by obtaining missing documents. But more often, as you know, the demand process is more complex. Demands are generally received in connection with misrepresentation of income, occupancy, employment, or regarding undisclosed debt or mortgages, and valuation concerns.

Improvements to the Process

Because of the complexity of each demand, the numerous ways to resolve them, and the seriousness of these issues to both of our businesses, Wells Fargo is taking steps to improve the demand process.

Here are some changes and tools we're implementing to improve the process:

- **Enhancing communication and collaboration** with our clients by:
  - Engaging you as early as possible.
  - Working closely with you to clear deficiencies discovered on the loan during investor audits.
- **Repurchase and Rescission Scenarios Exhibit** – This document provides insight on how Wells Fargo approaches many of the most common demand issues.
- Improving our demand process (outlined below), effective October 18, 2010

**In this communication, investors and MI companies are collectively referred to as "investors" and reference will be made to both repurchase demands and MI rescissions jointly as "demands".*

Overview of Wells Fargo's Demand Process – Effective October 18, 2010

Step 1

Wells Fargo receives a deficiency notice or demand from the investor. Typically, Wells Fargo has 60 days to resolve the issue.

Step 2

Wells Fargo notifies the Seller and provides supporting documentation when available. At this time, the **Seller is given twenty-one calendar days to provide an explanation**, facts or documentation to demonstrate that the mortgage loan complies with the requirements. If the Seller does not respond within 14 days of the initial notice, Wells Fargo will follow up with the Seller.

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(Continued on page 2)

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Repurchase and Rescission Process Overview

October15, 2010

Overview of Wells Fargo's Demand Process *(Continued)*

Step 3

Wells Fargo will begin internal research (concurrently with Step 2) to resolve the loan issues. During this process, Wells Fargo will **determine if there is a missing document** and if the document can be located.

For all other issues, Wells Fargo will perform research to determine if there is evidence that proves or disproves the validity of the issue. For example, if the investor provided a review appraisal indicating a value deviation, Wells Fargo will order an independent appraisal review of the origination appraisal and the investor's review appraisal from a third party vendor.

Step 4

The Seller responds to Wells Fargo's request and either agrees with the investor's findings or provides an explanation, missing documents or information for Wells Fargo to utilize in drafting an appeal to the demand or MI rescission notification.

If an appeal is not practical, based on all the information collected, Wells Fargo will notify the Seller, allowing them a final opportunity to provide additional documentation.

If an appeal is submitted to an investor, the Seller will be notified of the result of the appeal. If the Seller provided a response that specifically addressed the investor's issues and the investor deems the information to be insufficient to rescind the repurchase demand or MI rescission, **the Seller will be given** seven (7) **calendar days** to provide **new documentation** to support a second appeal. *(Please note: Even if documents are provided by the Seller, the appeal may not be successful).*

If attempts to refute the demand or MI rescission are unsuccessful, Wells Fargo will be obligated to repurchase the loan from the investor or accept the MI rescission. Likewise, Wells Fargo will issue a demand to the Seller for the repurchase of the mortgage loan pursuant to the provisions of the Loan Purchase Agreement or reimbursement for costs and expenses, if applicable.

Questions?

- Send repurchase letter questions to our mailbox at IRMRepurchaseResponses@wellsfargo.com. The mailbox is monitored daily with replies to inquiries completed within 3 business days, or
- You may contact a member of your regional sales team.

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Shared Vision, Shared Success[SM]. Together, we can achieve long-term industry success. Learn more today.

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EQUAL HOUSING LENDER

Wells Fargo Funding

Repurchase and Rescission Scenarios Exhibit

When an MI rescission or repurchase demand is received by our Wells Fargo Repurchase Operations team, Wells Fargo will research the issues to determine if there was a breach of a representation or warranty, or non-compliance with a term of the Mortgage Insurance policy.

- If there is **no** breach, the analyst will appeal the repurchase demand or MI company decision.
- If there **is a** breach, the analyst will recommend the loan for repurchase. If the loan is recommended for repurchase, the recommendation is escalated for a second level review. The final determination to repurchase or appeal the demand is made in the second level review.

The matrix on the following pages provides insight into how Wells Fargo analysts review each demand to help determine if there is a breach of a representation and warranty. Examples provided in the matrix are not all inclusive, but represent some of the more common and complicated types of MI rescissions or repurchase demands.

Note: *This information is provided as general guidance only and does not change, alter or modify any contractual obligations between Wells Fargo and the Correspondent Seller. Individual cases may vary. Information provided below is subject to change at any time and without notice.*

	Scenario	Action/test performed by Wells Fargo	How you can help
1	**Undisclosed Debt** **Definition:** The borrower has additional debt that was obtained prior to the closing of the subject loan, but it is not reflected on the origination credit report or application. It is not included in the qualifying ratios for the subject loan.	▪ Was debt included in the original underwriting calculations? ▪ What date was the debt opened? If it was opened in the same month as the loan closing date, the exact date must be verified to ensure that the debt was opened **prior to closing.** ▪ Does the new DTI, including the undisclosed debt, exceed the allowable DTI for the program?	▪ Provide evidence that the debt was included in the qualifying debt ratio. ▪ Provide documentation that the debt was opened after the subject loan closing date. ▪ Provide debt ratio calculations documenting that the debt ratio would have remained at an acceptable level. ▪ Provide documentation that the debt or a portion of the debt was eligible for exclusion from the debt ratio (e.g. provide lease if the property was a rental).

Wells Fargo Funding

WELLS FARGO

Repurchase and Rescission Scenarios Exhibit

	Scenario	Action/test performed by Wells Fargo	How you can help
2	**Occupancy Misrepresentation** **Definition:** The occupancy of the subject property is misrepresented in an effort to obtain more favorable financing options.	The decision to repurchase for this breach is based on an evaluation or weighting of the evidence presented. As a general principle, Wells Fargo considers occupancy misrepresentation documented if the answer is "yes" to at least two of the following: **Closing Documentation** 1. Does the appraisal indicate that the property is tenant-occupied? 2. Is the homeowner's declaration page reflecting a landlord policy? 3. For a refinance - is the documentation provided to verify income and/or assets reflecting a different address for the borrower? 4. Is the distance between the subject property and the borrower's employment unreasonable for commuting? **Post-closing Documentation** 5. Is the property tax statement for the borrower reflecting a different mailing address? 6. Did the borrower change their mailing address for servicing communication? 7. Does a reverse directory search of the borrower's home phone reflect a different home address? 8. Is there documented verification that the utilities are not and have not been in the borrower's name? 9. Are there public records (driver's license, voter registration, homestead exemption) that indicate the borrower never moved into the property? 10. Do the bankruptcy discharge papers indicate a different home address for the borrower for the timeframe following closing? 11. Is there documented communication between the borrower and a third party investigator indicating the borrower never occupied the subject property?	▪ Provide documentation that proves that the borrower occupied/ occupies the subject property. ▪ If the borrower intended to occupy the property, but did not, provide an explanation for the extenuating circumstances that prohibited the borrower from moving into the property. ▪ Offer an explanation and documentation to refute the evidence provided (e.g. the address that the borrower is utilizing for servicing correspondence and property tax records is actually their business address).

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	Scenario	Action/test performed by Wells Fargo	How you can help:
3	**Income Misrepresentation** **Definition:** The income information and/or documentation that were provided at origination were either altered or falsified.	▪ Does the new income documentation provided reflect the same time period as the 1003 application? ▪ Is the new income documentation re-verifiable? If re-verification is not possible, is the investor's documentation clear and complete? ▪ Was the original documentation altered or falsified? ▪ Does the DTI utilizing the new income exceed an allowable DTI for the program?	▪ Provide documentation that the verification provided does not represent the same time period as the 1003 application. ▪ Provide new documentation (verbal or written) that supports the original income documentation.
4	**Employment Misrepresentation** **Definition:** The employment status (self employed vs. W-2; Full time vs. Part time), dates or job title are misrepresented on the loan application and supporting documentation.	▪ Does the documentation provided reflect the same time period as the 1003? ▪ Are the differences in employment substantial? E.g. was the verified profession essentially the same as the stated profession (supervisor vs. manager). ▪ Is the documentation re-verifiable? If re-verification is not possible, is the investor's documentation clear and complete?	▪ Provide documentation that the verification provided does not represent the same time period as the application. ▪ Provide new documentation that supports the original verification.

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	Scenario	Action/test performed by Wells Fargo	How you can help:
5	**Valuation/Appraisal Misrepresentation** **Definition:** The original appraiser did not follow USPAP or FIRREA standards when developing the origination appraisal.	Wells Fargo will order an independent third party review of the origination appraisal and the review appraisal from a vendor (at Wells Fargo expense). As part of the review process, the vendor will: ▪ Obtain a property detail report for the subject property that contains an aerial photo of the subject property and additional sales, ▪ Verify the sale date, price and history for all sales referenced within any of the appraisal reports provided, ▪ Verify the appraiser's licensure, ▪ Ensure that the appraiser was appropriately licensed as of the effective date of the appraisal and make note if the license had been revoked at any time, ▪ Analyze market conditions as of the effective date of the appraisal and pull additional market trend data if necessary, ▪ Summarize all items of note, in the form of an e-mail, to be addressed by the original appraiser. MLS sheets for the sales that have been utilized will also be requested, in addition to any other additional local market support that is available. Items of note will include, but are not limited to: o Concerns or discrepancies noted by the local market review, o Concerns noted within the MI Rescission letter or Demand Request, o Reviewer concerns not noted by the local market review or rescission letter. After a response is received from the original appraiser, the vendor makes a determination about whether or not the value was supported as of the effective date of the appraisal. The Wells Fargo analyst will determine the following: ▪ Does the review support the original value? ▪ Does the reviewer state that the original appraisal contains USPAP or FIRREA violations?	▪ Encourage the origination appraiser to provide the Wells Fargo vendor with all requested documentation. ▪ Provide an independent review appraisal that supports the original appraisal.

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Repurchase and Rescission Scenarios Exhibit

	Scenario	Action/test performed by Wells Fargo	How you can help:
6	**Missing Docs** **Definition:** One or more required documents were not delivered to the investor.	▪ Was the document applicable or required? ▪ Can the document be located on the Wells Fargo imaging system? ▪ Can the document be retrieved by contacting the original provider (e.g. missing title policy)?	▪ Provide the document that is being requested. ▪ Provide evidence that the document was not required or applicable. ▪ Can the document be retrieved by contacting the original provider or a third party vendor (e.g. missing title policy)?
7	**Compliance** **Definition:** Investor determines that the loan did not meet State, Federal or Agency guidelines or regulations.	Wells Fargo's Compliance Department will conduct a compliance review specific to the compliance issue raised by the investor. Their review includes: ▪ A determination as to whether the cited regulation applies to the loan, ▪ Testing the loan according to the appropriate regulations. Wells Fargo determines the following: ▪ Did the loan pass the compliance test? ▪ If the loan did not pass, do the specified regulations provide for a curing of the issue?	▪ Provide the original compliance testing calculations and results indicating a pass for the issue identified by the investor. ▪ Provide evidence that the regulation is not applicable to the loan. ▪ Provide proof that the issue was cured prior to delivery, if allowable and applicable. ▪ Provide documentation to prove that the loan passes the compliance test (For example, if failure is fee based, provide documentation that certain fees can be excluded from the test, such as bona fide discount points).

Repurchase and Rescission Scenarios Exhibit

Frequently Asked Questions

1) Why wasn't my response used in the appeal to the investor?

Answer: Wells Fargo has a direct contractual relationship with its end-investors, and Wells Fargo believes it is more effective and efficient for Wells Fargo to communicate directly with the end-investors with one concise message. Your responses are instrumental in the analysis of the repurchase demands, as well as the drafting of thorough appeals to the end-investors' findings.

2) Why can't Wells Fargo share servicing notes and/or any subsequently pulled borrower credit reports with the correspondent clients?

Answer: Servicing notes and borrower credit reports contain the borrower's sensitive, non-public financial information. The disclosure of this information is heavily regulated. Wells Fargo takes its responsibility to protect this sensitive borrower information very seriously. Wells Fargo's disclosure policies ensure compliance with consumer privacy laws and the Fair Credit Reporting Act.

3) Why is there sometimes such a significant period of time between when Wells Fargo purchases the loan and when they advise me of a breach?

Answer: Frequently, issues that occurred during the origination of the loan are not apparent until much later (often times during the foreclosure process).

4) On a loan where the underwriting was completed on a "prior approved" basis, why am I liable for defects with the appraisal such as appraiser fraud?

Answer: For these loans, under the terms of the contract between the Seller and Wells Fargo, the Seller retains liability for issues connected with the appraisal that are not underwriter error.

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